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# TIME PATTERNS IN PROSE

## A STUDY IN PROSE RHYTHM BASED UPON VOICE RECORDS

by

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# CHAPTER I. INTRODUCTORY

## Methods of Studying Prose Rhythm

Ever since Aristotle men have talked and written about prose rhythm. But though during the centuries they have learned many things about themselves and the world in which they live, they have made only slight advances in the study of the rhythm of prose. Perhaps nothing more clearly indicates the difficulty of the problem than the variety of methods that have been employed to study the baffling subject and the comparatively meager returns.

Professor Marbe in Germany and Professor Saintsbury in Scotland are among those who have followed the time-honored verse method of routine scansion. Professor Saintsbury's conclusion that just as coincidence is the distinguishing feature of verse, so is variety that of prose, is typical of the findings of this method.

More fruitful of results has been the work of those who have followed what may be described as the historical method. These men have studied the naturalization in English of the Latin *cursus*. Their thesis is that either consciously or unconsciously in the church liturgy, and especially in the translation of the collects, the *cursus* endings have been brought into our language and that the accompanying latinization of our vocabulary has favored their growth. Phrase endings in the collects and elsewhere that seem to derive from the mediaeval *cursus* can thus be separated out from those that seem to derive from Old English. Albert C. Clark and John Shelly in England and Morris W. Croll in this country have worked along these and related lines.

A third method is through the study of small and characteristic groupings of words such as we find in idioms, in titles, in preferred word order. Our preference for a *bread and butter* rhythm over a *butter and bread* one, our almost racial instinct to

misplace *only* and to split infinitives,—in such matters as these Professors Scott, Jespersen, and van Draat have sought the working of a rhythmic law. Characteristic ejaculations and grunts have also been studied.

The reduction of prose to musical notation and a treatment of it from the musician's point of view, its reduction to taps and a treatment of it from the psychologist's point of view, as well as the study through introspection and psychological experiment of individual differences in rhythmic experience and performance are still other ways in which the question has been attacked. These studies, most of them by psychologists, are of genuine help along the way, but they do not deal with prose itself.

Finally there is the study of voice records, a method entirely objective that concerns itself with the physical facts of exactly how a given passage is read by a given individual.

## Voice Records

These voice records are got in different ways: by the direct registry method of the phonograph as used by Scripture and Wallin in their studies of speech; by photographing the speech waves as both Miller and Patterson do—although the latter disregards his photographs in the interest of studying subjective reactions; and by some form of the apparatus devised by the Abbé Rousselot for his work in phonetics. An adaptation of the Rousselot method is used in the present study as described below.

## Apparatus

The instrument used in making the voice records here studied was constructed by Professor John F. Shepard of the University of Michigan for work in experimental phonetics.[1]

By means of it the vibrations set up by the tones of the reader, both nasals and vowels, and the accompanying outflow of breath from mouth and nose are recorded on a broad band of smoked paper that revolves around the two drums of a kymograph.[2]

[1] A full description of this instrument may be found in the *Psychological Bulletin* for February 15, 1913.

[2] The kymograph used was the complete Zimmermann pattern, with Herring slide and extended writing plane.

The reader in speaking into the receiving instrument fits his mouth and nose as closely to it as he can. Its two chambers, for the mouth and nose, respectively, are edged with rubber to render them relatively air-tight, and they are packed with cotton to do away, in so far as may be, with the resonance of the metal.

Four rubber tubes lead from this receiver, two from the nose chamber and two from the mouth chamber. One tube in each pair ends in a tone recorder—a shallow, circular sound chamber, about 43 mm. in diameter, mounted on a short glass tube carrier over which the connecting rubber tube fits and by means of which it is held in place. This chamber is covered by a thin mica disc on the center of which a small aluminum triangle is mounted. Articulated with the triangle is the delicate recording needle made out of two pieces of quill scraped thin and glued together at right angles to each other in such a way as greatly to lessen nodal vibrations. Thus the vibrations of the nasals and vocals, carried from the receiving chambers through the rubber tubes into the little sound chamber, are transmitted through its mica top to the quill mounted above, which in its turn records them on the revolving band of smoked paper. The other two tubes, one from each chamber, end in Marey tambours. These are covered with rubber dam which gives easily to the pressure of the breath from mouth and nose and transmits the fluctuations of pressure to the recording needles. A Jacquet chronograph, marking fifths of seconds, and another needle that records the reader's gesture of emphasis (described below) as well as the four recorders already described were all mounted upon a universal tripod.

Thus beginning at the bottom of a voice record (see the reproduction of a section of Passage 6 on page 5) we have (1) the time line marked off in fifths of seconds, the time unit used in this study; (2) the mouth-tone line; (3) the nose-tone line; (4) the line of breath pressure from the nose; (5) the line of breath pressure from the mouth; and (6) the line of the emphasis recorder.

This emphasis recorder is a device by which the motor-minded reader can indicate with his forefinger, which rests in a noose of

string, his motor reactions to the passage as he reads it. Like an orchestra leader he marks out the time and thought with his hand.

## Disadvantages and Advantages of the Method Used

The chief disadvantages of the method here described are, as the writer sees them, on the one hand, for the study of prose, the physical limitation of the length of the passage recorded—whole paragraphs rather than separate sentences should be studied; and on the other hand, the artificial condition of speaking into a receiving instrument.

Both of these two objections are overcome by the other two methods; but in the use of the phonograph more serious sources of error arise. Changes in the speed at which the record was made distort the facts of speech and make pauses seem to appear where no pauses were. In the photograph of the sound wave, unless the apparatus be of an unusual delicacy, one can only guess at what is happening during the absence of voice. The interval may be filled by voiceless consonants or it may be a pause. Also in deciphering such records one misses the help given by the breath pressure lines.

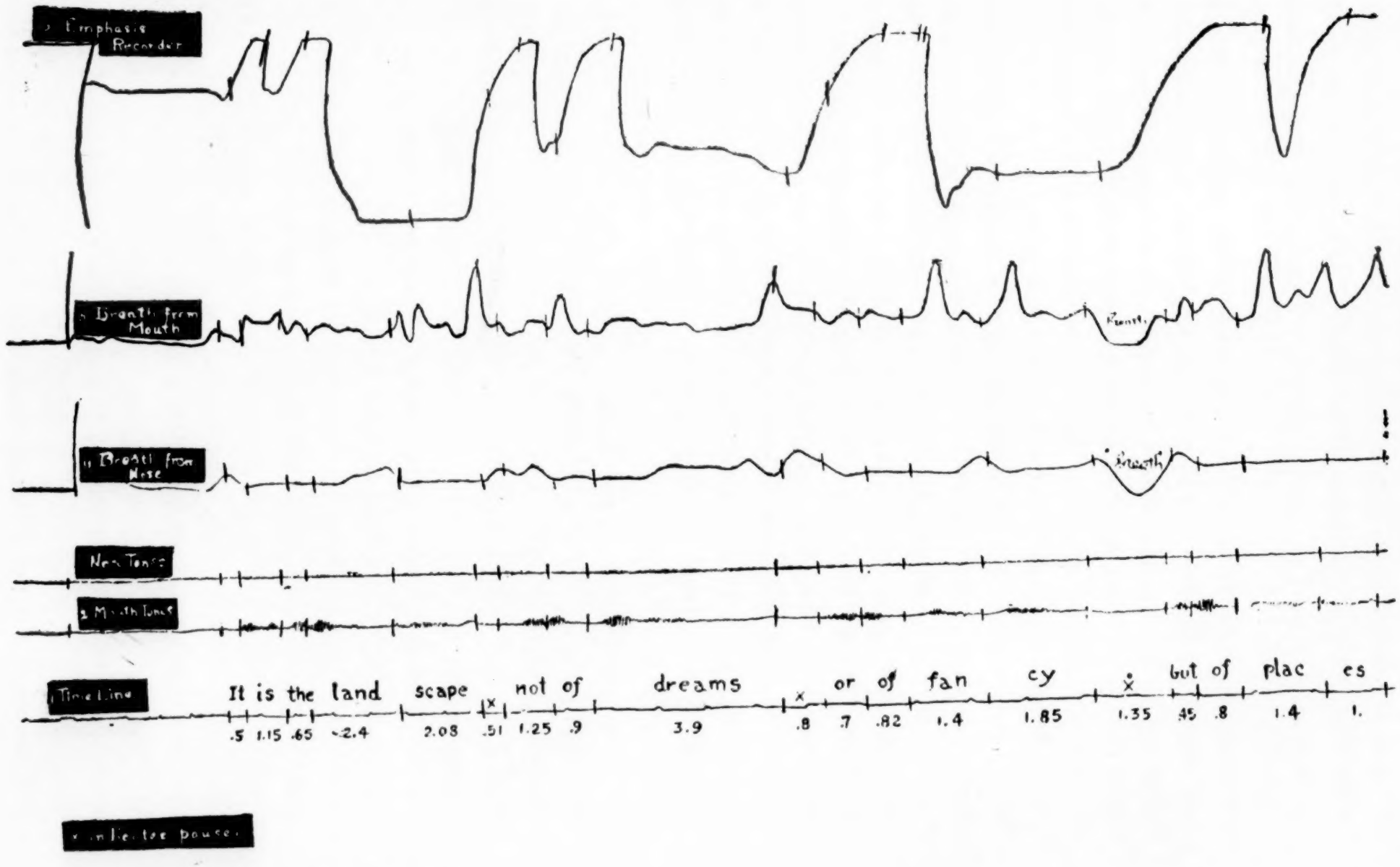
Constant reference to the breath pressure lines from nose and mouth made it possible for the reader of the present records to have a fairly clear idea of what was happening among the speech organs and so to be relatively sure of the beginnings and endings of speech, and, within the flow of speech, of the smaller divisions between groups of sound.

## Procedure

The use of the various lines can best be understood by examining the reproduction on page 5 of "It is the landscape, not of dreams or of fancy," a section of Passage 6. As the first letter is a vowel, the beginning of speech is indicated by the beginning of the vibrations on line 2.[3]

[3] This point is in one sense arbitrarily marked, for we do not know exactly when those vibrations became audible. We assume, however, that for the reader at least the sensation of speech begins with the beginning of movement in the vocal organs. As this point of view is kept throughout, any error there may be is constant and so will not affect the study of rhythm.

REPRODUCTION OF A VOICE RECORD


1 Emphasis Recorder
3 Breath from Mouth
4 Breath from Nose
Nose Tones
2 Mouth Tones
Time Line
It is the land scape x not of dreams x or of fan cy x but of plac es
.5 1.15 .65 2.4 2.08 .51 1.25 .9 3.9 .8 .7 .82 1.4 1.85 1.35 .45 .8 1.4 1.
x indicates pauses

From line 5 we learn that the *t* of *it* was not exploded, for the rise in that line corresponds to fresh vibrations on the mouth-tone line (*2*) and so marks the beginning of the breath impulse for the *i* of *is*.

Line 5 is again used for determining the beginning and end of *scape*. The double peak at the beginning is a characteristic formation for the *ska* sound which one soon learns to recognize; and the end of the syllable is marked by the explosion of the *p*.

Lines 3 and 4 determine the beginning of the *n* in *not*. Notice the fall in 5 which corresponds to the rise in 4.

The beginning of the *d* of *dreams* is shown by the drop on line 5 made by the closure of the vocal passage for *d*. Stopped consonants can be located in this way, the difficulty being when they come after a pause (see the *b* of *but*); for then how is one to know where the pause ends and the closure begins? This question was answered by studying the *b*'s or other consonants in question in positions where their beginnings could be located (the word *abbot,* for instance, was one of the words used for *b*) and so for a given speaker finding out the approximate length of time the vocal organs take in adjusting for the given consonant.

Three pauses are noted in the section reproduced. Between the explosion of the *p* and the beginning of the vibrations for *n* there is a brief pause. Again at the end of *dreams* (located on line 5 by the breath expulsion of the *s*) there is another short pause before the beginning, on line 2, of the *o* vibrations of *or*. In the third pause, that after *fancy,* a breath is taken, as is shown by the characteristic dips in lines 4 and 5.

Perhaps this is enough to indicate the method used in deciphering the records and to demonstrate its comparative accuracy.

Two other matters of procedure should be mentioned. One, that before any records were made, the readers practiced reading into the receiving chamber until it seemed both to themselves and to observers that they were so well accustomed to the instrument as to read in what appeared to be an unrestrained and natural way. Some never arrived at this point and so were not used.

The other matter insisted upon was that before a record was

made the readers should have the passage in its context to study at leisure in order to get into the spirit and rhythm of the whole.[4]

## Limitation of Field Studied

Such accuracy as has been described above holds for time relations only. The use of the receiving chamber and of recording needles makes the records inaccurate for matters of intensity.[5] And a time division into fifths of seconds only is too coarse a measure for the determination of pitch.

The present study, therefore, is limited to an analysis of the time patterns of certain prose passages as determined by the measurement of voice records. Although the melodic pattern of varying pitch and the stress pattern of varying intensity, as well as the more subtle rhythms of tone-color, must all be studied before we can arrive at any full understanding of the nature of prose rhythm, it is both possible and desirable to examine the time patterns by themselves. We should be able to answer the question so often asked: Has the temporal basis that we feel in prose rhythm an objective existence?[6]

## Purpose and Plan

The purpose of this study, then, is to present the temporal facts involved in the reading by different persons of selected passages of prose in order to discover what rôle time plays in the rhythm of prose.

[4] The writer does not agree with Dr. Jacob that rhythmic prose is a matter of the occasional sentence only. (See Jacob's *Foundations and Nature of Verse,* p. 202). Metrical prose is fortunately only occasional, but rhythmic prose seems rather a matter of the texture of the whole. Only by reading a passage in its context can its surge and flow be appreciated to the full; for its movement, if not spurious, is part of a larger movement.

[5] An estimation of relative intensity, however, may perhaps be got at by comparing the amplitudes of the vibrations of the nonsense syllables with those of the same syllables occurring in connected speech. This suggestion, made by Professor Shepard of Michigan, the writer hopes to investigate in a later study.

[6] Dr. Patterson in his monograph on *The Rhythm of Prose* thinks that time is the basic element. He says (p. 98) that "only when the temporal intervals involved are in the forefront is the resulting experience strictly rhythmical." Dr. Morris, on the other hand, in his work on *The Orchestration of the Metrical Line* says (p. 161) "Pitch and stress are the only prime factors of prose."

Such a study divides itself naturally into the following chapters; for length concerns itself with both silence and sound and time in reading is a matter of both length and rate, that is, of how long and how fast. Therefore Chapter II will deal with the number, length, and placing of pauses; Chapter III with the units of speech set off by pause, here called sound units; and Chapter IV with rate, the change in tempo from one sound unit to another and within the unit from syllable to syllable.

## Material Used

The material studied falls into the following four groups:

Group I.—The so-called *spaced* prose of the earlier tradition, the prose of Malory, Ralegh, Bacon, Donne, and Burke. Certain characteristics of this prose have come down to our own time. The *spatial* tendency of oratorical English is a case in point.

Group II.—More modern prose, here called *fluid* prose, in which there is not so much a sense of balance as a sense of movement.

Group III.—Non-rhythmic prose, good modern prose judged to be, comparatively speaking, non-rhythmic.

Group IV.—Nonsense syllables. This last group, made up of the separate syllables appearing in the foregoing passages, was for the purpose of having a standard of comparison by which to estimate the contractions and expansions of syllables when they occur in the flux of speech. (See Chapter IV, p. 67.)

The results of a similar study made of Milton's blank verse by Professor Snell (see footnote p. 21) furnished valuable material for comparison.

The greater part of the work was done with the fluid prose of the second group, in particular with the prose of Walter Pater. Equipped as he was with a sensitive ear and an exceptional patience in revision, Pater has left us a body of prose unique in the integrity of its prose rhythm. Saintsbury says of his work, "on this apex of English prose, if on no other, there is rest!" [7]

[7] Saintsbury, *History of English Prose Rhythm*, p. 420.

The passages selected from Pater are descriptive, narrative, and expository. This range in kinds of writing was another reason for choosing the highly rhythmical but almost never metrical prose of Walter Pater.

Because of its bearings on the question of the Latin influence on our rhythms as well as for its interest in itself, the percentage of monosyllables in the selected passages is given in parentheses after each quotation. No account of their monosyllabic nature was taken when the selections were made. The figures are offered simply as an interesting aside.

The following are the passages studied.

### Group I

#### Spaced Prose

1. Through this man and me hath all this war been wrought, and the death of the most noblest knights of the world; for through our love that we have loved together is my most noble lord slain. Therefore, Sir Lancelot, wit thou well I am set in such plight to get my soul's health; and yet I trust, through God's grace, that after my death to have sight of the blessed face of Christ, and at doomsday to sit on his right side, for as sinful as ever I was are saints in heaven. Therefore, Sir Lancelot, I require thee and beseech thee heartily, for all the love that ever was betwixt us, that thou never see me more in the visage; and I command thee on God's behalf, that thou forsake my company, and to thy kingdom thou turn again and keep well thy realm from war and wrack. For as well as I have loved thee, mine heart will not serve me to see thee; for through thee and me is the flower of kings and knights destroyed. Therefore, Sir Lancelot, go to thy realm, and there take thee a wife, and live with her with joy and bliss, and I pray thee heartily pray for me to our Lord, that I may amend my misliving.

Malory, Sir Thomas: *Morte d'Arthur,* Bk. 21, Chap. 9 (81.36 monosyllabic).

2. O eloquent, just, and mighty Death! whom none could advise, thou hast persuaded; what none hath dared, thou hast done; and whom all the world has flattered, thou only has cast out of the world and despised. Thou hast drawn together all the far-stretched greatness, all the pride, cruelty, and ambition of men, and covered it all over with these two narrow words, Hic Jacet.

Ralegh, Sir Walter: *The History of the World,* Bk. V, Chap. VI. (75.38)

3. To the poor Christian that sits bound in the galley;—to despairful widows,—pensive prisoners,—to them whose fortune runs back—and whose spirits mutiny—unto such—death is a redeemer,—and the grave a place for rest.

Bacon, Sir Francis (?): Appendix to his essay. (71.79)

4. If some king of the earth have so large an extent of dominion in north and south as that he hath winter and summer together in his dominions; so large an extent east and west as that he hath day and night together in his dominions, much more hath God mercy and justice together. He brought light out of darkness, not out of a lesser light; He can bring thy summer out of winter though thou have no spring; though in the ways of fortune, or understanding, or conscience, thou have been benighted till now, wintered and frozen, clouded and eclipsed, damped and benumbed, smothered and stupefied till now, now God comes to thee, not as in the dawning of the day, not as in the bud of the spring, but as the sun at noon to illustrate all shadows, as the sheaves in harvest to fill all penuries. All occasions invite His mercies, and all times are His seasons.

Donne, John: *Eighty Sermons,* p. 13. (77.5)

5. As long as our sovereign lord the King, and his faithful subjects, the lords and commons of this realm—the triple cord, which no man can break; the solemn, sworn, constitutional frank-pledge of this nation; the firm guarantees of each others' being, and each others' rights; the joint and several securities, each in its place and order, for every kind and every quality, of property and of dignity; as long as these endure, so long the Duke of Bedford is safe: and we are all safe together—the high from the blights of envy and the spoliations of rapacity; the low from the iron hand of oppression and the insolent spurn of contempt.

Burke, Edmund: *A Letter to a Noble Lord,* 1796, Vol. II, p. 205, Harper's, 1837. (72.56)

## Group II

## Fluid Prose

(All the Pater references are to the Macmillan 1904 complete edition of his works.)

6. It is the landscape, not of dreams or of fancy, but of places far withdrawn, and hours selected from a thousand with a miracle of *finesse.*

The Renaissance, *Leonardo da Vinci,* p. 115. (69.2)

7. The perfume of the little flowers of the lime-tree fell through the air upon them like rain; while time seemed to move ever more slowly to the murmur of bees in it, till it almost stood still on June afternoons.

Miscellaneous Studies, *The Child in the House,* p. 151. (75.)

8. In the windless weather all seemed to be listening to the roar of the immemorial waterfall, plunging down so unassociably among these human habitations, and with a motion so unchanging from age to age as to count, even in this time-worn place, as an image of unalterable rest.

*Marius the Epicurean,* p. 233. (66.66)

9. The *old house,* as when Florian talked of it afterwards he always called it, (as all children do, who can recollect a change of home, soon enough but not too soon to mark a period in their lives) really was an old house; and an element of French descent in its inmates—descent from Watteau, the old court-painter, one of whose gallant pieces still hung in one of the rooms—might explain, together with some other things, a noticeable trimness and

comely whiteness about everything there—the curtains, the couches, the paint on the walls with which the light and shadow played so delicately; might explain also the tolerance of the great poplar in the garden, a tree most often despised by English people, but which French people love, having observed a certain fresh way its leaves have of dealing with the wind, making it sound, in never so slight a stirring of the air, like running water.

Miscellaneous Studies, *The Child in the House,* pp. 148–149. (69.62)

10. The true aspect of the place, especially of the house there in which he had lived as a child, the fashion of its doors, its hearths, its windows, the very scent upon the air of it, was with him in sleep for a season; only with tints more musically blent on wall and floor, and some finer light and shadow running in and out along its curves and angles, and with all its little carvings daintier.

Miscellaneous Studies, *The Child in the House,* p. 147 (77.63)

11. And so, with the bird found, but himself in an agony of home-sickness, thus capriciously sprung up within him, he was driven quickly away, far into the rural distance, so fondly speculated on, of that favorite country-road.

Miscellaneous Studies, *The Child in the House,* p. 169. (59.459)

12. Brothers and sisters, all alike were gardeners, methodically intimate with their flowers.

Miscellaneous Studies, *Emerald Uthwart,* p. 172. (41.66)

13. And that unrivalled fairness and freshness of aspect—how did he alone preserve it untouched, through the wind and heat?

Imaginary Portraits, *Denys L'Auxerrois,* p. 64. (65.)

14. The presence that rose thus so strangely beside the waters, is expressive of what in the ways of a thousand years men had come to desire. Hers is the head upon which "all the ends of the world are come," and the eyelids are a little weary. It is a beauty wrought out from within upon the flesh, the deposit, little cell by cell, of strange thoughts and fantastic reveries and exquisite passions. Set it for a moment beside one of those white Greek goddesses or beautiful women of antiquity, and how would they be troubled by this beauty, into which the soul with all its maladies has passed!

The Renaissance, *Leonardo da Vinci,* pp. 129–130. (72.47)

15. Observe the veritable atmosphere about it, the grand composition of the drapery, the magic relief, the sweetness and dignity of the human hands and faces, the noble tenderness of Mary's gesture, the unity of the thing with itself, the faultless exclusion of all that does not belong to its main purpose; it is like a single, simple axiomatic thought.

Miscellaneous Studies, *Raphael,* p. 38. (57.62)

16. He makes us stay to watch such dyers, as he had done, busy with their purple stuff; adding as it were ethic color to what he sees with the eye, and painting while he goes, as if on the margin of his high philosophical discourse, himself scarcely aware; as the monkish scribe set bird or flower, with so much truth of earth, in the blank spaces of his heavenly meditation.

Plato and Platonism, p. 119. (74.28)

17. The blithe, crisp sentence, decisive as a child's expression of its needs, may alternate with the long-contending, victoriously intricate sentence; the sentence born with the integrity of a single word, relieving the sort of sentence in which, if you look closely, you can see much contrivance, much adjustment, to bring a highly qualified matter into compass at one view.

Appreciations, *Essay on Style,* p. 19. (64.33)

18. A book like a person has its fortunes with one; is lucky or unlucky in the precise moment of its falling in our way, and often by some happy accident counts with us for something more than its independent value.

Marius the Epicurean, p. 69. (67.5)

19. Product of a myriad various minds and contending tongues, compact of obscure and minute association, a language has its own abundant and often recondite laws, in the habitual and summary recognition of which scholarship consists.

Appreciations, *Essay on Style,* p. 9. (51.42)

20. He who thus penetrated into the most secret parts of nature preferred always the more to the less remote, what, seeming exceptional, was an instance of law more refined, the construction about things of a peculiar atmosphere and mixed lights. He paints flowers with such curious felicity that different writers have attributed to him a fondness for particular flowers, as Clement the cyclamen, and Rio the jasmin; while, at Venice, there is a stray leaf from his portfolio dotted all over with studies of violets and the wild rose. In him first appears the taste for what is *bizarre* or *recherché* in landscape; hollow places full of the green shadow of bituminous rocks, ridged reefs of trap-rock which cut the water into quaint sheets of light—their exact antitype is in our own western seas; all the solemn effects of moving water; you may follow it springing from its distant source among the rocks on the heath of the *Madonna of the Balances,* passing, as a little fall, into the treacherous calm of the *Madonna of the Lake,* next, as a goodly river, below the cliffs of the *Madonna of the Rocks,* washing the white walls of its distant villages, stealing out in a network of divided streams in *La Gioconda* to the seashore of the *Saint Anne*—that delicate place, where the wind passes like the hand of some fine etcher over the surface, and the untorn shells are lying thick upon the sand, and the tops of the rocks, to which the waves never rise, are green with grass, grown fine as hair. *It is the landscape, not of dreams or of fancy, but of places far withdrawn, and hours selected from a thousand with a miracle of finesse.* Through Leonardo's strange veil of sight things reach him so; in no ordinary night or day, but as in faint light of eclipse, or in some brief interval of falling rain at daybreak, or through deep water.

The Renaissance, *Leonardo da Vinci,* pp. 114–115. (69.81)

## Group III

## Non-rhythmic Prose

(The term *non-rhythmic* should not be misunderstood. *Less rhythmic* would be a more exact expression. Wundt's dictum that "no series of impressions is possible that cannot in some way be comprehended as rhythmic"[8] comes to

[8] Wundt, Grundzüge d. Psychol. III, p. 53.

mind when one tries to find passages of good prose that can be called non-rhythmic. In the present case various readers were consulted. They agreed that the passages chosen possess a minimum of rhythm. This judgment was doubtless based in part on content. But a passage like *22* in which the clauses are restrictive and so do not admit of being set off by pauses probably comes most near to what we call non-rhythmic.)

21. While a study of the punctuation of good books is of great value, the compositor must not overlook that of newspapers, magazines, directories, catalogues, advertisements, circulars, and other forms of commercial work. Different methods of punctuation are required for these different forms of printed work. These methods are not always interchangeable, nor can they be formulated by fixed rule. The compositor who hopes for clean proofs must study also the rules of punctuation prevailing in the house in which he is employed.

De Vinne: *Practice of Typography,* p. 260. (64.63)

22. For this purpose the partials must be so produced that they are completely subordinate to the proper pitch of the tone played and do not draw away the attention from the pitch of the latter to their own pitches or otherwise upset its balance.

Watt, Henry J.: *The Psychology of Sound,* p. 214. (70.45)

23. There is no doubt that the dislocation of the exchanges due to the war is an impediment to victory. The occasion of the remark is the appeal of gallant Italy that she shall not be compelled to pay twice for the goods necessary to oppose the Huns, as is practically the case when her currency and ours show their present want of balance.

*New York Times* Editorial, July 18, 1918. (74.6)

24. The æsthetic critic, then, regards all the objects with which he has to do, all works of art, and the fairer forms of nature and human life, as powers or forces producing pleasurable sensations, each of a more or less unique kind. This influence he feels and wishes to explain, analysing it, and reducing it to its elements.

Pater, Walter: *Preface to Renaissance,* p. IX. (67.24)

## Number of Records

In all about 150 records were made. Instead of taking an equal number of records of all the passages, the plan pursued was to take many records of a few (18 records, for instance, were made of Passage 6) in order to study in detail individual variation and variation among readers, and fewer of others in order to cover as wide a range of material as possible. With two exceptions, however, two or more records were made of each passage.

## Explanation of Terms Used

*Rhythm*—The term rhythm is used in so many different ways that it may be well to make clear at the outset how it is used in the present study.

When we speak of the rhythm of the stars we have in mind their periodicity. Their rhythm is an intellectual concept for us, the result of observation, and not anything immediately perceived. Rhythm is not here used in that sense. A rhythm is here regarded as an immediately perceived pattern. A sense of rhythm comes from a succession of such patterns. The patterns need not be identical with one another. If there is something about the second that suggests the first, and something about the third that suggests the second, and so on, we are satisfied.

Artists speak of the rhythm of recurrent pattern and the rhythm of flowing line. I should like to take over the terms for literature and make an analogous distinction. In both types of rhythm two elements are present,—recurrence and movement. In the rhythm of recurrent pattern the dominating impression is one of recurrence; in the rhythm of flowing line, on the other hand, the impression of recurrence may be virtually submerged. The impression of aesthetically satisfying movement is uppermost in our consciousness.

That much more is present both above and below the surface of consciousness must always be remembered. What is uppermost is only a small part of the whole. It is wise to remind ourselves of this fact when we are studying, as we are here, one single, isolated constituent of rhythm.

*Pause*—Pauses are of two kinds,—those made for the purpose of distinct articulation and not felt as pause by the reader or heard as pause by the listener, and those that are so felt and heard. It takes a certain amount of time for the speech organs to change from the position necessary for certain sounds to the position necessary for certain differently placed succeeding sounds. In saying (Passage 17) "The blithe, crisp sentence," for instance, those readers who enunciated carefully paused after both *blithe* and *crisp,* though they themselves were unaware of

the fact and it was not noted by their hearers. Such pauses, therefore, are probably not group-forming in their character and so are not considered in this study. They are here referred to as *distinction pauses.*

*Sound Units*—Any pause that is felt as pause by the speaker or heard as pause by the listener divides the flow of speech for speaker and listener into phonetic groups. These groups are called in this study *sound units.* They are, as their name implies, units of sound and as such establish the larger rhythm of the passage.

*Syllable*—In the absence of any full study of the syllable phonetically considered, the writer had to assume certain premises and act as though they were true. And this when even the existence of a syllable as a phonetic unit is in question!

The general feeling, however, is expressed by Professor Goodell when he says " The times of the successive sounds within a phrase flow on and run into each other without break; but something happens in passing from one syllable to the next that causes us to feel that there a break was made. . . . Precisely where in the flow of sounds that articulating process, that audible break, occurs—if we come down to the minutest measurement—it is difficult to say; but it occurs somewhere; all recognize that speech is jointed and that syllables are real entities." [9]

For the present purpose the definition of a syllable as a " distinguishable open mouth expression " was taken and for division between syllables the rough rule was followed that in the case of single consonants the consonants go with the stressed syllable. Thus the word *habitual* was divided ha-bit-u-al. If there are two different consonants one goes with each syllable (vide *fan-cy*), excepting when the two consonants seem phonetically linked as in *miracle* where the *l* is syllabic and attracts the *k* sound to it, *mir-a-cle.*

*Unit of Measurement*—The unit of measurement used throughout is a fifth of a second.

[9] Goodell, Chapters on Greek Metric, p. 88.

## Readers

Nine persons acted as readers. Unless otherwise stated they were all members of the faculty or of the student body at the University of Michigan. A is a professor of psychology; B, a professor of English; C, an associate professor of rhetoric; D, an instructor of rhetoric; E, an instructor of oratory; F, an instructor of psychology; G, an instructor of English in an eastern college; H, a student of general linguistics; I, a student of oratory.

There was an attempt in selecting the readers to have represented variety of background and interest. In all cases ease in reading into the instrument and understanding of the text were insisted upon.

# CHAPTER II. PAUSE

## Introductory

While sound is made up of many patterns laid one on top of another or interwoven—patterns of time, of stress, of pitch, of tone-color—silence is entirely a matter of time and so becomes of first importance in a study, like the present, of time relations.

The particular points here investigated are: 1. What different kinds of pauses are shown by the records? What of their relation to a study of rhythm? Does breathing determine the placing of pause? 2. Is more pause used in certain kinds of prose than in others? 3. What factors determine the amount of pause? 4. What is the relation of punctuation to pause? 5. How do the different kinds of prose compare with one another and with blank verse as to length and number of pauses? 6. The greater variety in length and number of fluid prose pauses serves what purposes? 7. How do individuals vary in their use of pause? 8. What relation exists between lengthened syllables and pause? 9. To what extent do readers agree in the placing of pause? What conclusions may be drawn from this agreement?

## Kinds of Pause

Group-forming pauses[10] are for the reader of two kinds. During some he is taking a breath; during others his vocal organs are at rest or falling into a position of rest. The listener is unaware of this distinction. For him pauses differ only in length. The question as to whether these *breath pauses* and *rest pauses,* as we may for convenience call them, should be treated separately or not, depends upon the relation of breathing to pause.

[10] Distinction pauses, probably not group-forming, are discussed on page 14.

## Relation of Breathing to Pause

Oliver Wendell Holmes' medico-literary observation that Spenser breathed more slowly than Prior—a deduction made from comparing the rhythm of their respective verses—prompts one to ask whether a man's breathing habits may not determine the way in which he reads prose as well as that in which he writes poetry?

To answer this question the breath pauses were listed separately from the rest pauses in the first five passages studied (Passages 6, 7, 8, 17, and 19) and the following table compiled:

Table I

Relation of Breathing to Pause

| Readers | Number of syllables concerned | Number of pauses made | Number of breath pauses | Percentage breath pauses of total number |
|---|---|---|---|---|
| A | 807 | 56 | 26 | 46.4 |
| B | 375 | 24 | 18 | 75 |
| D | 561 | 36 | 13 | 36.1 |
| E | 648 | 46 | 38 | 82.6 |
| F | 266 | 16 | 15 | 93.7 |
| G | 411 | 39 | 34 | 87.1 |
| Total for all | 3068 | 217 | 144 | 66.36— |

A wide range in frequency of breathing is represented by the six readers above,—a range that goes from D's 36.1 per cent to F's 93.7 per cent, a span of 57.6. That is, F breathed at nearly every pause; D at scarcely one-third of his pauses.

That the number of pauses is not determined by the frequency of breathing is shown by the fact that A, who pauses according to the above table on the average of every 14.4 syllables, takes breath in only 46 per cent of his pauses or in other words he breathed in not quite every other pause; while E, whose pause average is nearest A's, a pause for every 14.09 syllables, takes breath in 82 per cent of his pauses, that is he breathes in 4 out of every 5 pauses. Or compare B and D. B pauses for every 15.6 syllables and breathes in 75 per cent of his pauses, or in 3 out of every 4 pauses; D paused for every 15.5 syllables and breathed in only 36 per cent of his pauses, or at every third pause.

Further evidence that the variety noted in the above table is in the taking of breath during pause rather than in the placing of pause is given by the figures on uniformity in placing pause, page 34. From such widely different breathing habits one would expect to find no such uniformity in placing pause if pause were determined by breathing habits.

It may also be pointed out that since it is possible for a speaker to enunciate as many as one hundred and seventy-five syllables between breaths, the need to stop for breath when no stop is indicated by the writer is not likely to arise in modern prose. The longest group found anywhere in the records studied is one of forty syllables in A's reading of Passage 23. But the breath capacity for possible long runs is still further testimony to the point already made, that the need to take breath is not a factor with the reader in determining the placing of pause and in setting off phrasal units.

Is it a factor in determining the length of pause? The total time of the breath pauses is 336.05; of the rest pauses, 103.6. The breath pauses are longer than the rest pauses; their averages are 2.33 and 1.419, respectively. Does this mean that those readers who breathe frequently make longer pauses than the others?

Not necessarily. The evidence seems to indicate that breath was taken in those longer pauses because they are long rather than that they are long because time was needed for breathing. That is, their length depends on logical and rhythmic factors rather than on physiological.

Thus a certain pause will be long for all readers although not all readers take a breath during it. Nor is it always longest for those that do so employ it. The records show much variety in breath pause. In some the taking of breath occupies only part of the time of the pause; in others the voice begins before the end of the inhalation. In the records studied no reader breathed at even approximately regular intervals. The breathing is adapted to the logical and rhythmical demands of the reading. The reader who paused most often and breathed most frequently

has a few long runs, one of twenty-five syllables and another of twenty-nine. The trained speakers tended to take shorter and more frequent breaths than the others, apparently to keep the lungs full for any unforeseen demands the reading might make upon them.

Since the breathing seems to govern neither the placing nor the length of pause, it would appear that the distinction between rest pauses and breath pauses has probably little bearing on the present study. They are not therefore treated separately.[11]

While we are thus able to fit our breathing into the pause pattern of any writer, we instinctively prefer certain styles to others. A partial explanation for our preference may very well lie in the fact that in some the pauses come at intervals physiologically and intellectually more convenient to us than in others. That is, people who breathe and walk to a quick, short, sharp measure usually prefer writers who pause often; and those for whom abstractions and sustained thought are uncongenial may very naturally prefer writers who come to frequent full stops.

## The Relation of Pause to Speech

Continuous sound, the roar of a waterfall, for instance, or the whirr and clatter of machines in a factory, soon loses its significance for us and ceases to be noticed. Only when silence is interposed do we become actively attentive to sound. Pauses in speech are what set off the sound; the silences drive home the sense.

Consequently it is not surprising to find the actual bulk of pause in speech considerable. The following table gives the percentage of pause in the total speaking time for the different forms here studied. All readers and all records are included.

[11] The following quotation from Ruchmich's article on *The Rôle of Kinaesthesis in the Perception of Rhythm* corroborates from a different point of view this question of the relation between rhythm and breathing. It says that "Whatever significance respiration may have on the conscious side, physically there is no ground for belief, on the basis of some 50 kymographic records of the rates of breathing during rhythmical perceptions, that there is actual physical correspondence between this rate and the rate of the rhythm perceived." *Am. Jour. Psychol.*, 24:355.

TABLE II

Relation of Pause to Speech

| Material | Percent | Range in pause length in separate sentences | Span of range |
|---|---|---|---|
| Non-rhythmic Prose..... | 11.89 | 2.1 –19.59 | 17.49 |
| Fluid Prose..... | 14.22 | 2.94–22.43 | 19.49 |
| Spaced Prose..... | 19.87 | 15.01–27.56 | 12.55 |
| Blank Verse[12]..... | 19 | | |

This table shows that the amount of pause varies for the different kinds of prose; that spaced prose and blank verse involve approximately the same amount of pause, nearly a fifth of the total speaking time; that non-rhythmic prose contains less pause than other forms; that the percentage of pause in fluid prose is nearer that of non-rhythmic than that of spaced prose, but that the greater span seems to show more variety and flexibility in its structure.

The percentage of pause in total time for fluid prose would doubtless be greater than it is if the material studied were not so largely made up of separate sentences. For instance the percentage for Passage 20, in which there are five continuous sentences, is 17.57. Even so it is less than that for spaced prose and blank verse.

## FACTORS DETERMINING PAUSE

Variations in the total amount of pause in different passages may be due to any one of the three factors that influence pause or to a combination of them. For pause may be determined by subject matter, by rhetorical structure, by the sensitiveness of the reader to rhythmical effects.

As the different kinds of prose represented in the table were read by the same readers, the differences observed in the relation of silence to sound are here due to the first two factors,—subject matter and structure. On page 12 it was noted that the nearest

[12] The figures for the blank verse here as elsewhere in this study are taken from a monograph by Ada L. F. Snell entitled *Pause: A Study of its Nature and its Rhythmical Function in Verse, Especially Blank Verse*, edited by F. N. Scott and published in Ann Arbor, Mich., 1918. Professor Snell's work was based on voice records made by the same instrument as that used for the present study, and in some cases by the same readers as well. A comparison of the results is therefore of special value.

approach to non-rhythmical prose occurs in passages, such as Passage 22, employing the direct word order and built up out of restrictive phrases and clauses, passages in which a minimum of pause is involved. It is equally obvious that the special quality of spaced prose is due in large measure to the fact that its structure involves many pauses. Comparatively short phrases are balanced against one another,—are, in short, *spaced*.

But in the more modern fluid prose the structure is more flexible and varied, and the length of the pauses made, if not their number, is more determined by the first cause mentioned, the nature of the subject matter. Professor Scott's distinction between poetry and prose—that "poetry is communication in language for expression's sake" and prose "expression in language for communication's sake"[13] suggests the reason why some prose is naturally read more rapidly than other prose and with fewer and shorter pauses. Passage 21 is a case in point. Its structure admits of a highly rhythmical reading—as indeed does that of any catalogue, witness the train crier's calling of stations—but the technical subject matter of it made its readers classify it as non-rhythmical. An article in the Sewanee Review[14] develops this point,—that prose depends for its rhythm on subject matter quite as much as on rhythmical pattern.[15]

[13] Scott, Fred Newton: *The Most Fundamental Differentia of Poetry and Prose.* Mod. Lang. Assoc. Pub., 1904, pp. 250–270.

[14] Andrews, C. E.: *The Rhythm of Prose and Free Verse.* Sewanee Review, April–June, 1918.

[15] It might be added that when verse, particularly blank verse, is printed as prose, it is equally dependent on subject matter for a rhythmical rendering.

The writer tried some experiments on successive classes of college juniors and seniors who had all had special training in metrics. Selected verse and prose passages, all of them printed as prose, were given to the students to study. They were asked to determine the nature of each passage, giving in every case the reasons for their judgment, and to arrange in verse form the passages identified as verse. Blank verse regular in form but prosaic in subject matter was judged by the majority to be prose because of the subject matter. That is, for most readers, printed form and subject matter determine how they read a passage.

Writers of free verse by their use of the broken line have a way of calling attention to rhythmical effects that are often overlooked when the same material is printed as prose. For this focusing of popular attention upon the phrase as a rhythmic unit, lovers of prose should be grateful to the *vers librists.*

To get at the third cause for variation in the amount of pause used, the difference in the sensitiveness of readers to rhythmical effects, the following table was compiled for three typically different readers.

TABLE III

Relation of Pause to Speech for Different Readers

| Reader | Material | Number of syllables concerned | Percentage of range of pause | Range in pause length in separate sentences | Span |
|---|---|---|---|---|---|
| A | Non-rhythmic .. | 533 | 9.42 | 2.10–16.59 | 14.49 |
| | Fluid ..... | 1,836 | 13.43 | 2.94–22.43 | 19.49 |
| | Spaced ..... | 562 | 19.05 | 15.01–27.56 | 12.53 |
| C | Non-rhythmic .. | 149 | 12.19 | 8.25–15.21 | 6.96 |
| | Fluid ..... | 618 | 11.59 | 4.81–16.03 | 11.27 |
| | Spaced ..... | 248 | 19.96 | 19.91–20.04 | .13 |
| G | Non-rhythmic .. | 138 | 16.82 | one record only | |
| | Fluid ..... | 1,612 | 16.79 | 10.72–20.37 | 9.65 |
| | Spaced ..... | 53 | 17.61 | one record only | |

Here it is seen that reader A made more use of pause than did the other two readers and apparently for consciously aesthetic ends. He pauses both more and less often than the other readers, according to the nature of the passage he is reading. The sentence in which the percentage of pause is lowest is one of his readings of Passage 6, and the sentence in which it is highest is his reading of Passage 4. The total of his pause is lowest for non-rhythmic prose and most for spaced prose. The range in his pause length is greatest for fluid prose.

The absence of all such discrimination in G's pause lengths is in part accounted for by the fact that while his pauses within the sentence reflect to a certain extent the character of the material read, his pauses between sentences are uniformly long and so bring up the average for all forms. But when such allowance has been made it would still appear that readers C and G make less sensitive use of pause than does reader A.

In summing up we may say that subject matter is what largely determines the more rapid reading of non-rhythmic prose and the consequent shorter pauses; that structure is what determines the high percentage of pause for spaced prose and blank verse;

that both structure and subject matter make for the greater range in the amount of pause that distinguishes fluid prose; and that readers differ widely in the discriminating use of pause. Although a passage may be judged non-rhythmic and yet have a large proportion of pause (in A's reading of Passage 21, 16.59 per cent of the entire speaking time was silence), or may be judged highly rhythmic when there is little pause (as in A's reading of Passage 7 in which only 4.27 per cent of the total speaking time was silence), yet taken as a whole, the relation of the amount of pause in total speaking time to rhythm is fairly close.

## The Relation of Punctuation to Pause

Punctuation is one means a writer has for indicating or at least suggesting pause. That he makes increasingly less use of it is the popular belief, and so far as colons, semicolons, and commas go, such a belief is founded on fact. For these marks are less used than formerly. The development of prose away from the architecturally elaborate sentence of many members set off from one another results in the natural disuse of the colon and the comparative inactivity of the semicolon. The diminished use of the comma, on the other hand, is not so much due to these structural changes as to a change in typographical taste. It is significant that although relatively fewer commas were used in the fluid prose studied than in the spaced prose, the proportion of those that command pause is greater. For instead of being used wherever an excuse offers, commas are used only where necessary to the sense. In strictly contemporary prose the number of commas would be still fewer than in the prose studied and the proportion of pauses for them probably greater. Thus a decrease in the number of punctuation marks used may be accompanied by a closer relationship between punctuation and pause.

But whether with the many more periods which our shorter sentences entail and the present rage for dots, dashes, and exclamation points, the actual number of marks used is so much smaller than it used to be, is open to question. The greater difference is probably in kind rather than in number.

That there is some difference in number, however, is shown by the material studied, and particularly if we remember that the fluid prose here represented is the nineteenth century prose of Walter Pater whose constant use of qualifying words, phrases, and clauses brings up the number of commas to more than what the average would be for most fluid prose of today. For the material here used, counting all marks of punctuation excepting quotation marks, we find for spaced prose one mark of punctuation to every 6.86 words; for fluid prose, one to every 7.86 words; and for non-rhythmic prose, one to every 10.74 words.

The next table shows to what extent punctuation commands pause. Only those marks occurring fifty or more times in the records are here included since averages based on fewer occurrences would be of doubtful value. The totals include all marks. Notice that although readers do not pause always for all marks of punctuation and do sometimes pause where there is no punctuation, still on the whole the relationship between punctuation and pause would seem to be fairly close.

TABLE IV

The Relation of Punctuation to Pause

| Mark | Number of occurrences | Number of occurrences paused | Percentage of occurrences paused | Average length of pause |
|---|---|---|---|---|
| Period . . . . . | 53 | 53 | 100 | 4.51 |
| Semicolon . . . . . | 58 | 58 | 100 | 3.25 |
| Comma . . . . . | 581 | 504 | 86.74 | 2. |
| Total of all marks . . . . | 774 | 692 | 89.4 | |
| Unpunctuated pauses . . | 206 | | | 1.27 |

The readers paused at all periods, colons, semicolons, and parentheses; at 86.74 per cent of the commas; and at 97.36 per cent of the dashes. Of the 898 pauses made in the records studied, 206 of them were made independently of punctuation; that is, 22.93 per cent of the pauses were not punctuated. Of the 692 marks of punctuation, 82 were not paused; in terms of percentage, 10.59 per cent of the marks of punctuation were not paused. The average length of the unpunctuated pause is shorter than that of the other pauses.

These results differ only slightly from those for Milton's blank verse, the difference being of the kind one would expect from the more regular character of verse. The surprise is that the results are so similar. For instance, in the verse studied,[16] 92 per cent of all the punctuation marks were paused (in prose 89 per cent); 18 per cent of all the pauses were unpunctuated (in prose nearly 23 per cent). Reduced to the terms of the unit here used, the length of the average pause for a period in blank verse is 3.75; for a semicolon, 2.75; for a comma, 2.2; and for an unpunctuated pause, 1.3. A comparison with the table above shows that the period and semicolon pauses are slightly shorter for verse than for prose, and the comma and unpunctuated pauses slightly longer. The difference between the longest and the shortest average pause is therefore less for verse than for prose, and the comma and unpunctuated pauses are slightly longer. Again we note a little more flexibility and variety in the prose than in the verse.

## Length and Number of Pauses

Very short pauses may be detected by the ear. How short we do not know. To quote from the *American Text-book of Physiology* (Vol. II, p. 388): "The ear is eminently the sense apparatus for determining small intervals of time. Flashes of light succeeding each other at the rate of twenty-four in a second are fused in continuous luminous impression by the eye, but by the ear at least one hundred and thirty-two auditory impulses as beats may be heard separately in a second." But these figures do not answer our query. Pulsations in continuous sound cannot be compared with intervals of silence. And even if we had the figures of a laboratory experiment on the discrimination of silent intervals they would serve as only a partial answer. For in reading, the attention is not fixed on the discrimination of pause but rather on what is set off by pause, and so the briefest observable silences probably go unobserved. On the other hand, the lengthening of the word or syllable before a pause (see p. 32) probably makes the pause seem to both speaker and listener longer than it

[16] Snell, op. cit., pp. 18–21.

is. In the records read the shortest pause found was .3 or .06 seconds. (Distinction pauses were shorter, but for reasons given on page 14 they are not here included.)

The following table gives for the different kinds of prose and for blank verse the number and average length of the pauses. Nineteen non-rhythmic sentences are here represented; 117 fluid prose sentences; 21 spaced prose, and 17 blank verse sentences.[17] Modern usage would break both the spaced prose and the blank verse into more sentences than are listed above.

TABLE V

Length and Number of Pauses

| Material | Total number pauses | Average length of pause | Range in length of pause | Span of range | Median | Mode |
|---|---|---|---|---|---|---|
| Non-rhythmic prose.. | 56 | 2.05— | .3– 6.88 | 6.58 | 1.53 | 1.2 |
| Fluid prose . . . . . | 797 | 2.12+ | .3–10.05 | 9.75 | 1.8 | 2 |
| Spaced prose . . . . . | 174 | 2.43— | .3– 9.7 | 9.4 | 2.35 | 2 |
| Blank verse . . . . . | 168 | 2.25 | .3– 6.5 | 6.2 | 2.1 | 2.5 |

From this table and from the percentage column of Table II we see that non-rhythmic prose has fewer and shorter pauses than the other forms studied; that although the average length of pause for the different kinds of material studied is very nearly the same—the difference between the shortest and the longest average is only .38 (.076 of a second)—the similarity in average does not evidence a like similarity in the pauses themselves. The pause of most frequent occurrence in non-rhythmic prose is only 1.2, while the most frequent pause in verse is 2.5. Fluid and spaced prose have the same most frequent pause length and show also a greater range in pause length than the other forms.

So far as pause is concerned the difference between them is better shown in the next table, in which the pauses between sentences and the pauses within sentences are listed separately.

[17] Snell, op. cit., p. 32. The blank verse studied is Milton's *Paradise Lost*, Bk. II:604–653 and Bk. III:1–55. In this table as elsewhere Dr. Snell's unit of measurement, a second, has been reduced for purposes of comparison to the one here used, a fifth of a second.

TABLE VI

Length and Number of Differently Placed Pauses

| Material | Number of pauses within sentence | Average number of internal pauses per sentence | Average length of internal pause | Number of pauses between sentences | Average length of pause between sentences |
|---|---|---|---|---|---|
| Non-rhythmic prose.. | 46 | 2.42+ | 1.47— | 10 | 4.62— |
| Fluid prose . . . . . | 775 | 5.43— | 1.99 | 22 | 4.57— |
| Spaced prose . . . . . | 164 | 7.81— | 2.38+ | 10 | 3.13 |
| Blank verse . . . . . | 152 | 8.94 | | 16 | |

Here we see the greater uniformity between the period pauses and the internal pauses for spaced prose than for the other kinds. It is another evidence of the fact that for spaced prose the unit is the clause rather than the sentence. The resulting movement is more like the regular patterned movement of a minuet than like the free but equally rhythmic motions of an aesthetic dancer. The effect is one of balance rather than of progression.

## LENGTH AND PLACING OF PAUSE

To examine more in detail this greater variety in pause length for fluid prose (and also the relation of pause length to the material set off and the question of agreement in the placing of pause), all the fluid prose passages read by two or more readers are given with all the pauses indicated as to where, how many, and how long they are. The total number of records appears at the beginning of each passage, the number of those in which a pause is found is given in parentheses at the place where the pause occurs, and beside it is the average length in one-fifth seconds of all the pauses made at that point.

*Passage 6 (18 records)*

It is the landscape, (11) 1.14 not of dreams (7) .63+ or of fancy, (18) 2.01 but of (1) .32 places (3) .87 far withdrawn, (18) 1.77 and hours (2) 1.4 selected from a thousand (8) 1.29 with a miracle (3) .59 of *finesse.*

*Passage 7 (9 records)*

The perfume of the little flowers of the lime-tree (5) 2.22 fell through the air upon them like rain; (9) 2.73+ while time seemed to move (2) 2.6 ever more slowly to the murmur of bees in it, (8) 2.29+ till it almost stood still (1) 2.5 on June afternoons.

*Passage 8 (9 records)*

In the windless weather (4) 1.22+ all seemed to be listening to the roar of the immemorial waterfall, (9) 2.35 plunging down so unassociably among these human habitations, (9) 2.72+ and with a motion so unchanging from age (5) .39 to age (2) 1.92+ as to count, (8) 1.88+ even in this time-worn place, (9) 2.05+ as an image of unalterable rest.

*Passage 9 (6 records)*

The *old house,* (5) 1.16 as when Florian talked of it afterwards he always called it, (6) 2.21+ (as all children do, who can recollect a change of home (5) 1.98 soon enough (5) .61 but not too soon to mark a period in their lives) (6) 3.46+ really was an old house; (6) 3.48+ and an element of French descent in its inmates— (6) 2.33+ descent from Watteau, the old court-painter, (6) 1.77+ one of whose gallant pieces (1) 1.8 still hung in one of the rooms—(6) 3. might explain, (5) 1.33+ together with some other things, (6) 1.9+ a noticeable trimness (2) 1.6 and comely whiteness (1) 2.3 about everything there— (6) 3.24+ the curtains, (6) 1.25+ the couches, (6) 1.66+ the paint on the walls with which the light (1) .7 and shadow (1) 2.9 played so delicately; (6) 3.07+ might explain also the tolerance (1) 1. of the great poplar in the garden, (6) 2.54+ a tree (1) .51 most often despised by English people, (6) 3.13+ but which (1) .75 French people love, (6) 2.58+ having observed a certain fresh way (2) 1.15 its leaves have (3) 2.7 of dealing with the wind, (6) 2.53+ making it sound, (5) .75 in never so slight a stirring of the air, (6) 1.99— like running water.

*Passage 10 (2 records)*

The true aspect of the place, (2) 1.5 especially of the house there in which he had lived as a child, (2) 2.31 the fashion of its doors, (1) .71 its hearths, (1) 1.67 its windows, (2) 2.89 the very scent upon the air of it, (2) 2.45 was with him in sleep (1) .65 for a season; (2) 4.13+ only with tints more musically blent (1) .87 on wall and floor, (2) 2.63 and some finer light and shadow (1) .79 running in and out along its curves and angles, (2) 3.56 and with all its little carvings daintier.

*Passage 11 (2 records)*

And so, (1) .9 with the bird found, (2) 1.43+ but himself in an agony of homesickness, (2) .91+ thus capriciously sprung up within him, (2) 3.39+ he was driven quickly away, (2) 1.62+ far into the rural distance, (2) 1.66+ so fondly speculated on, (2) 2.28 of that favorite country-road.

*Passage 12 (2 records)*

Brothers and sisters, (2) 1.01 all alike were gardeners, (2) 2.27 methodically (1) .47 intimate with their flowers.

*Passage 13 (2 records)*

And that unrivalled fairness and freshness of aspect— (2) 2.64+ how did he alone preserve it untouched, (2) 1.7 through the wind (1) .93 and heat?

*Passage 14 (9 records)*

The presence that rose thus (2) 1.15 so strangely beside the waters, (8) 2.61+ is (1) 1. expressive of what (3) 1.58 in the way of a thousand years (3) 1.18+ man had come to desire. (9) 4.1+ Hers is the head upon which

(5) .64 all the ends of the world are come, (9) 2.67+ and the eyelids (5) 1.12 are a little weary. (9) 3.84— It is a beauty (1) 1.6 wrought out from within (2) .75 upon the flesh, (9) 2.73+ the deposit, (9) 1.1+ little cell by cell, (7) 2.55+ of (2) 1.3 strange thoughts (7) 1.1 and fantastic reveries (6) 1.84+ and exquisite passions. (9) 5.72+ Set it for a moment beside one of those white Greek goddesses (6) 2.03+ or beautiful women of antiquity, (9) 2.54+ and how would they be troubled (1) .65 by this beauty, (9) 2.38+ into which (3) .75+ the soul (2) 1.01 with all its maladies (2) 1.35 has passed!

*Passage 15 (2 records)*

Observe the veritable atmosphere about it, (2) 1.88+ the grand composition of the drapery, (2) 1.71 the magic relief, (2) 2.19+ the sweetness and dignity of the human hands and faces, (2) 2.72 the noble tenderness of Mary's gesture, (2) 2.1 the unity of the thing itself, (2) 2.68+ the faultless exclusion of all that does not belong to its main purpose; (2) 3.25+ it is like a single, (2) 1.21+ simple (2) 1.81 axiomatic (1) .89 thought.

*Passage 16 (2 records)*

He makes us stay to watch such dyers, (1) 1.35 as he had done, (2) .67 busy with their purple stuff; (2) 3.49 adding as it were (2) .76+ ethic color (1) 1.4 to what he sees with the eye, (2) 1.88+ and painting while he goes, (1) .74 as if (1) .82 on the margin of his high philosophical discourse, (2) 1.87 himself scarcely aware; (2) 4.96+ as the monkish scribe set bird or flower, (1) .71 with so much truth of earth, (2) 1.42+ in the blank spaces of his heavenly meditation.

*Passage 17 (7 records)*

The blithe, crisp sentence, (7) 1.37+ decisive as a child's expression of its needs, (6) 1.86— may alternate (1) 2. with the long-contending, (3) 1.18+ victoriously intricate (1) 1.4 sentence; (7) 3.86+ the sentence born with the integrity of a single word, (7) 1.96+ relieving the sort of sentence (2) 1.6 in which, (7) 1.21 if you look closely, (7) 2.25+ you can see much contrivance, (6) 1.76+ much adjustment, (7) 1.76+ to bring a highly qualified matter (3) 1.56 into compass (2) 1.3 at one view.

*Passage 18 (2 records)*

A book (1) 1.1 like a person has its fortunes with one; (2) 2.27+ is lucky or unlucky (1) .38 in the precise moment of its falling in our way, (2) 2.32+ and often by some happy accident (2) 2.15 counts with us for something more than its independent value.

*Passage 19 (9 records)*

Product of a myriad (1) 1.8 various minds and contending tongues, (9) 2.92+ compact of obscure and minute associations, (9) 2.23— a language has its own abundant (1) 2.1 and often recondite laws, (9) 2.35 in the habitual and summary recognition of which (7) 1.85 scholarship consists.

## Relation of Pause Length to Material Set Off

An examination of the above passages shows that the length of a pause tends to indicate the relative importance, logical, and rhythmical, of the material set off.

In *It is the landscape, 1.14 not of dreams .63 or of fancy, 2.01,* for instance, the longer pause after *fancy* makes us hold as a larger unit all that has gone before, broken as it is into smaller units by shorter pauses.

Thus over and over again in the selections given above we see smaller sound units held together in a larger whole when set off by longer pauses. Especially interesting to study in this connection are Passages 9 and 10 for words in a series, Passages 14 and 15 for what the length of pause does both for grouping and for emphasis, and Passage 17.

It is further observed that the pauses made by one reader only are much shorter than the pauses at which more than one reader stopped. In those passages read five or more times, the average length of the pause made by one reader is 1.24; the average length of all pauses (only pauses within the sentence are considered in these figures) is 1.99; and the average length of those pauses made within the sentence by all readers is 2.38+.

## Individual Variation in the Use of Pause

As may be seen from the passages given (see also Table IX), individual variation in the use of pause is more a matter of length than of placing.

The next two tables give the number and length of pauses made by three different readers for the different kinds of prose.

Here again we see that although A habitually makes fewer pauses than the other readers and although his most frequent pause is shorter than that of the others, nevertheless, for fluid and for spaced prose at least, he shows even greater variety in pause length than the others. His reading of non-rhythmic prose is conspicuously more rapid than is his reading of the other kinds of prose. G's reading of the individual non-rhythmic sentence is more rapid, but his long pauses between sentences bring up the average. Table III (page 23) gives still further material on this point.

It is evident that some readers make much more use of pause

TABLE VII

Length and Number of Pauses for Different Readers

| Material | Reader | Total number of all pauses | Average length of pause | Range in length of pause | Span of range | Median | Mode |
|---|---|---|---|---|---|---|---|
| Non-rhythmic prose | A | 31 | 1.76— | .3 - 6.3 | 6 | 1.3 | 1.2 |
| | C | 36 | 2.23— | .87- 4.72 | 3.85 | 2.07 | 1.9 |
| | G | 14 | 2.48 | .34- 6.88 | 6.54 | 2.43 | 2.5 |
| Fluid prose | A | 161 | 1.97— | .3 -10.05 | 9.75 | 1.63 | 2 |
| | C | 49 | 2.04— | .58- 4.72 | 4.14 | 1.97 | 2.5 |
| | G | 175 | 2.39 | .31- 6.85 | 6.54 | 2.43 | 2.5 |
| Spaced prose | A | 61 | 2.55 | .65- 9.7 | 8.7 | 2.35 | 2 |
| | C | 36 | 2.17— | .32- 5.2 | 4.88 | 2.26 | 3.1 |
| | G | 10 | 2.15— | .43- 4.3 | 3.87 | 2.7 | 2.8 |

TABLE VIII

Length and Number of Differently Placed Pauses for Different Readers

| Material | Reader | No. of pauses within sentence | Av. No. of internal pauses per sentence | Average length of internal pause | Number of pauses between sentences | Av. length of pauses between sentences |
|---|---|---|---|---|---|---|
| Non-rhythmic prose | A | 25 | 2.08 | 1.27 | 6 | 3.75 |
| | C | 10 | 3.33 | 1.98 | 1 | 4.72 |
| | G | 11 | 2.75 | 1.43 | 3 | 6.31 |
| Fluid prose | A | 154 | 4.97— | 1.78 | 7 | 6.26 |
| | C | 48 | 5.33 | 1.98 | 1 | 4.72 |
| | G | 165 | 6.35 | 2.25 | 10 | 4.51 |
| Spaced prose | A | 59 | 8.43 | 2.38 | 2 | 7.4 |
| | C | 35 | 11.67 | 2.13 | 1 | 3.5 |
| | G | 10 | 10 | 2.15 | 0 | |

than others. It is not that they use more pause—though trained readers tend to pause more often than untrained ones—but that their pauses show greater range and flexibility. They seek by their pauses to bring out the writer's pattern.

## RELATION OF PAUSE TO LENGTHENED SYLLABLE

If we look again at Passage 6, page 28, *It is the landscape, not of dreams or of fancy,* we see that although all readers made a long pause after *fancy,* not all readers broke up the clause by pause into the three smaller units,—*it is the landscape, not of*

*dreams, or of fancy;* and yet when they were asked to indicate where they paused in the reading of a sentence, they all marked a pause after *landscape,* and all but two a pause after *dreams.*[18] That is, even those who did not break the larger unit into smaller ones by pauses, still thought of it as being so broken. Instead of pausing, they lengthened the final syllables of the smaller groups.

Now for all readers a lengthened final syllable is associated with pause. Even a syllable phonetically and logically unimportant is lengthened before a pause. In the passage under discussion the final syllable of *fancy* is a light unstressed syllable, and yet in five of the seven readings that set off by pause the four syllable group, *or of fancy, cy* is the longest syllable of the four and next to the longest in the remaining two. In the five additional readings that set off the larger unit, *not of dreams or of fancy,* it is the second longest syllable in four of the five occurrences and third longest in the fifth. (*Dreams* is the longest syllable for all readers.) And for the six remaining readings of the passage, readings in which the initial twelve syllables are a single sound unit, the first pause coming after *fancy, cy* is the third syllable in length for two, fourth for one, fifth for one, and sixth for two.

It is longer for all readers than any occurrence of it in the records in positions not followed by pause, but for all readers but one it is shorter than it was when pronounced as a nonsense syllable. For as a nonsense syllable it receives emphasis and is set off by pause on both sides; hence its greater length. (See page 67.) But since it is shorter as a nonsense syllable than is *fan,* its relative lengthening in Passage 6 is further illustrated.

What is true of this syllable was found true of all the light final syllables studied. The naturally long syllable is also length-

[18] In a table on page 12 of her study, Professor Snell lists the correspondences and differences in pausing between passages as they were read and as the readers thought they had read them. The results are typical for prose as well as for poetry. M, a professor of linguistics, the only reader who actually made more pauses than he indicated, probably did so because of his knowledge that length is mistaken for pause. All the other readers, both those tested by Professor Snell and those tested for this study, overestimated the number of pauses they made.

ened. Take *scape* in *landscape.* In seventeen of the eighteen records of Passage 6 *scape* was the longest syllable in the initial four words regardless of whether a pause came after it or not; although in reading the clause all readers put the accent upon *land,* and in saying the two syllables as nonsense syllables they made *land* the longer. Clearly here the increased length of *scape* must be due to the sense of pause.

## Uniformity in the Placing of Pause

The next thing to consider in the material already given (pages 28–30) is the measure of agreement found among the readers in placing pause. The following table gives the percentage of agreement for all the passages from Pater read by two or more readers:

Table IX

Agreement in Placing Pause

| Material (Passage number) | Number of records concerned | Total number of pauses | Percent of pauses made by all readers | Percent of additional pauses made by one or more readers | Percent of pauses made by less than ½ of the readers |
|---|---|---|---|---|---|
| 6 | 18 | 71 | 50.7 | 15.49 | 33.8 |
| 7 | 9 | 25 | 36 | 52 | 12 |
| 8 | 9 | 47 | 57.44 | 27.65 | 14.89 |
| 9 | 6 | 135 | 71.11 | 18.51 | 10.37 |
| 10 | 2 | 19 | 73.68 | 26.31 | |
| 11 | 2 | 14 | 85.71 | 14.28 | |
| 12 | 2 | 5 | 80 | 20 | |
| 13 | 2 | 5 | 80 | 20 | |
| 14 | 9 | 139 | 51.79 | 31.65 | 16.54 |
| 15 | 2 | 19 | 94.73 | 5.26 | |
| 16 | 2 | 19 | 73.68 | 26.31 | |
| 17 | 7 | 66 | 63.64 | 18.18 | 18.18 |
| 18 | 2 | 8 | 75 | 25 | |
| 19 | 9 | 36 | 75 | 19.44 | 5.55 |
| 24 | 2 | 15 | 93.33 | 6.66 | |
| Total | 83 | 623 | 63.4 | 22.95 | 13.64 |

These figures show a greater uniformity in placing pause than was shown in the blank verse records.[19] Out of the 212 blank verse pauses, 125 of them internal and 87 end line pauses, 121 were made by all readers. That is, the percentage of uniformity

[19] Snell, op. cit., pp. 33–34.

in placing pause in Pater's prose is 63.4 per cent, as against 57.07 per cent uniformity in placing pause in Milton's blank verse.

These figures, however, are open to criticism; for although nearly three times as many pauses are considered in Pater's prose as in Milton's verse, the Milton was read by five different readers whereas some of the passages from Pater were read by only two readers. One would naturally expect a greater uniformity where fewer readers are involved. Therefore a fairer basis of comparison can be had by taking only those passages from Pater read by five or more readers.

These are the figures: Out of a total of 519 pauses, 309 were made by all readers, 125 by one-half or more readers, and 85 by less than one-half. Or, in terms of percentage, 59.53 per cent of the pauses made are made by all readers (*cf.* the 57.07 per cent for Milton); 24.08 per cent additional pauses are made by one-half or more; and only 14.45 per cent show less than 50 per cent agreement.[20]

Actually the uniformity in phrasing, the sense of a prevailing phrase rhythm, is even greater than these figures indicate, for, as we have seen (pp. 32–34), on the one hand a lengthened syllable is frequently substituted for pause and, on the other, longer pauses mark off as a unit, sections in which there are shorter pauses not made by all readers.

The pattern of prose is thus seen to be as readily recognized and as clearly marked out by pause as is that of blank verse. Whether it can be considered a rhythmic pattern will be taken up in the next chapter.

## Summary of Chapter II

1. Although pauses are of three kinds,—pauses made necessary by the exigencies of articulation, called *distinction pauses;* pauses in which breath is taken, called *breath pauses;* and pauses in which the organs of speech are inactive, called *rest pauses,*— these different kinds are not taken up separately in this study.

[20] An 84% agreement was found for the spaced prose studied, but the fact that so few different readers are represented renders the figures of little value.

Distinction pauses are not considered at all because they are not felt as pause by the speaker or heard as pause by the listener, and so probably do not affect the rhythm of the sentence.

Breath and rest pauses are not considered separately because the records show that breathing does not determine the placing of pause. On the contrary, the logical and rhythmical demands of the passage determine the placing of pause, and breathing is freely adapted to such demands. There is therefore no reason, so far as a study of sentence rhythm goes, for treating these two kinds of pause separately.

2. The ratio of silence to sound in the reading of any passage depends on the subject matter, the rhetorical structure, and the rhythmic endowment of the reader.

Subject matter is what largely determines the more rapid reading of non-rhythmic prose and the consequently shorter pauses.

Structure is what determines the high percentage of pause for spaced prose and blank verse.

Both structure and subject matter make for the greater range in the amount of pause that characterizes fluid prose.

Although there are a few striking exceptions to the tendency, it may be said that in general the more rhythmical passages have a higher percentage of pause than the less rhythmical.

3. Unpunctuated pauses are shorter than punctuated pauses. They are also shorter, as compared with verse, than unpunctuated pauses in verse. As compared with the total number of pauses, only 22.93 per cent are not punctuated.

89.4 per cent of all marks of punctuation are paused. In prose, periods and semicolons command longer pauses and commas shorter ones than they do in verse, showing again the slightly greater range in prose pauses than in those of verse.

Although, as shown above, readers do not always pause for all marks of punctuation and do sometimes pause when there is no punctuation, yet on the whole the relation between punctuation and pause is fairly close.

4. Non-rhythmic prose has fewer and shorter pauses per sentence than the other kinds studied. Nor is the range in pause

length so great as for fluid and spaced prose. The length of the pause of most frequent occurrence is 1.2.

For fluid and spaced prose the pause of most frequent occurrence is 2. Here the likeness ends, for spaced prose has more pauses than fluid prose and fluid prose pauses exhibit greater variety in number and length.

The difference between the length of pauses within sentences and pauses between sentences is greater for non-rhythmic and fluid prose than it is for spaced prose and blank verse, thereby setting off the sentence unit as of major importance.

5. The length of a pause tends to be an indication of the relative importance, logical and rhythmical, of the material set off. Pauses made by one reader only are much shorter than the pauses at which more than one reader stopped.

6. Individual variation in the use of pause is more a matter of pause length than of the placing of pause. Some readers make more use of pause than others. It is not that they use more pause—though trained readers tend to pause more often than untrained ones—but that their pauses show greater range and flexibility. They seek by their pauses to bring out the writer's pattern.

7. A lengthened syllable, associated as it is with pause, is sometimes substituted for it. Analysis of the longer sound units shows that while pause sets off these units as a whole, lengthened syllables break each up into smaller parts.

8. As great uniformity in the placing of pause was found for fluid prose as for blank verse,—59.53 per cent uniformity for fluid prose as compared with 57.07 per cent for blank verse. If we take into account the fact that a lengthened syllable is frequently substituted for pause on the one hand, and on the other that longer pauses set off as a unit sections in which there are shorter pauses, the degree of uniformity will be still greater. The pattern of prose, so far as the matter of pausing goes, is thus seen to be as readily recognizable as is that of blank verse.

# CHAPTER III. SOUND UNITS

## Introductory

Sound units, that is, words or groups of words set off by pause, establish in prose, as they do in poetry, the larger movement of a passage. Whether this movement may be regarded as rhythmic depends in part upon the syllabic content and length of the sound units involved, matters which will be investigated in this chapter.

Do the sound units of the different kinds of prose differ from one another and from blank verse in their length and syllabic content? Are there certain units that recur in prose with greater frequency than other units, as do the four and six syllable groups in blank verse? How many syllables can be rhythmically organized within a single sound unit? How long may a sound unit be and yet be felt as a rhythmic whole? These are the questions which this chapter considers.

## Evidence Given by Speech Records

The following table shows what the speech records give as to length in one-fifth seconds and syllabic content of the forms studied.

An examination of this table shows (1) the kinship of spaced prose and blank verse in all the columns of the table; (2) the irregularity of non-rhythmic prose as compared to the other kinds,—the larger number of syllables in its average sound unit, the greater range in the number of syllables, the greater speed with which its sound units are said as compared with other kinds of prose, and the absence of any most frequent length; (3) the fact that the difference between fluid prose, spaced prose, and blank verse, so far as length and syllabic content go, is a difference of degree rather than of kind. The one exception to this conclusion is the much greater range for the time of the fluid prose sound units than for that of the others. The size and

TABLE X

Syllabic Content and Length of Sound Units

| Material | Syllabic Content: Number of sound units | Average number syllables per sound unit | Range in number syllables per sound unit | Span of range |
|---|---|---|---|---|
| Non-rhythmic Prose.. | 65 | 12.61+ | 3–40 | 37 |
| Fluid Prose..... | 752 | 9.68— | 1–34 | 33 |
| Spaced Prose..... | 185 | 7.42 | 1–23 | 22 |
| Blank Verse [21]..... | 168 | 6.3 | 1–21 | 20 |

| Material | Length: Average time of sound unit | Range in time of sound unit | Span of range | Median | Mode |
|---|---|---|---|---|---|
| Non-rhythmic Prose.. | 12.96— | .3 –37.5 | 34.5 | 11.35 | None |
| Fluid Prose..... | 11.37— | .65–43.3 | 42.65 | 9.62 | 9.4 |
| Spaced Prose..... | 9.1 — | .9 –25.68 | 24.78 | 8.4 | 6.6 |
| Blank Verse [21]..... | 9.5 | 2.1 –26.5 | 24.4 | 8.95 | 7.95 |

approximate agreement of the median and mode, however, indicate that the longer sound units, while bringing up the average length, testify to the greater flexibility of the fluid prose rather than to the absence of any most frequent grouping.[22]

Though the average speaking time for fluid prose is longer than for spaced prose the rate of speaking is really more rapid because more syllables are involved. The same is true of non-rhythmic prose as compared with fluid prose.

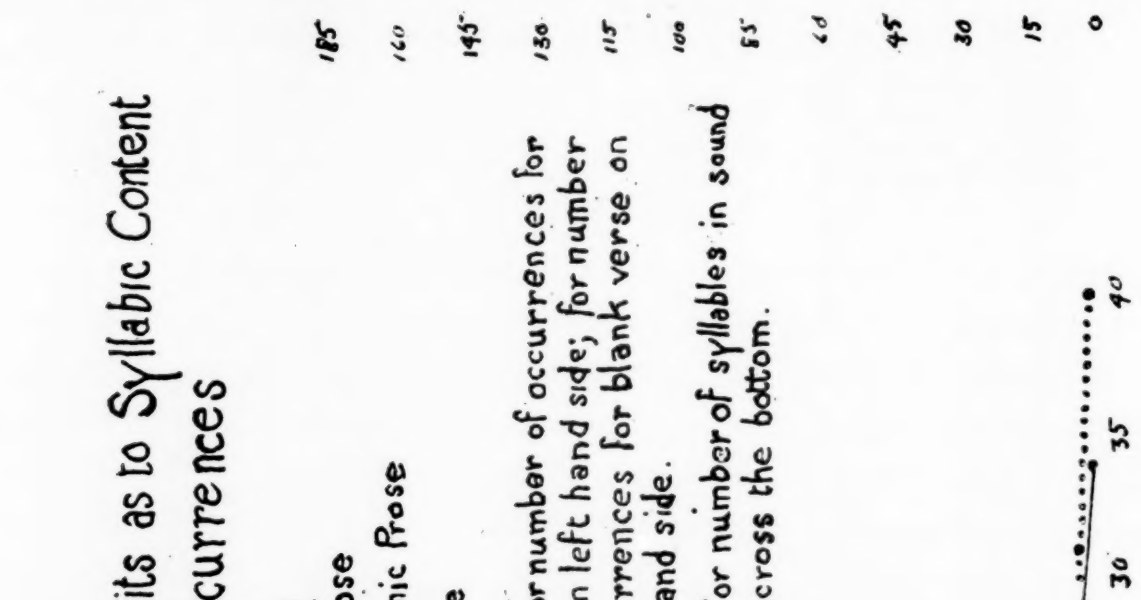
### DISTRIBUTION OF SOUND UNITS AS TO SYLLABIC CONTENT

To answer the second question,—Are there certain sound units that recur in prose with greater frequency than other units as do the four and six syllable groups in blank verse?—two graphs have been prepared. The two serve as a check one on the other; for,

[21] Snell, op. cit., p. 50

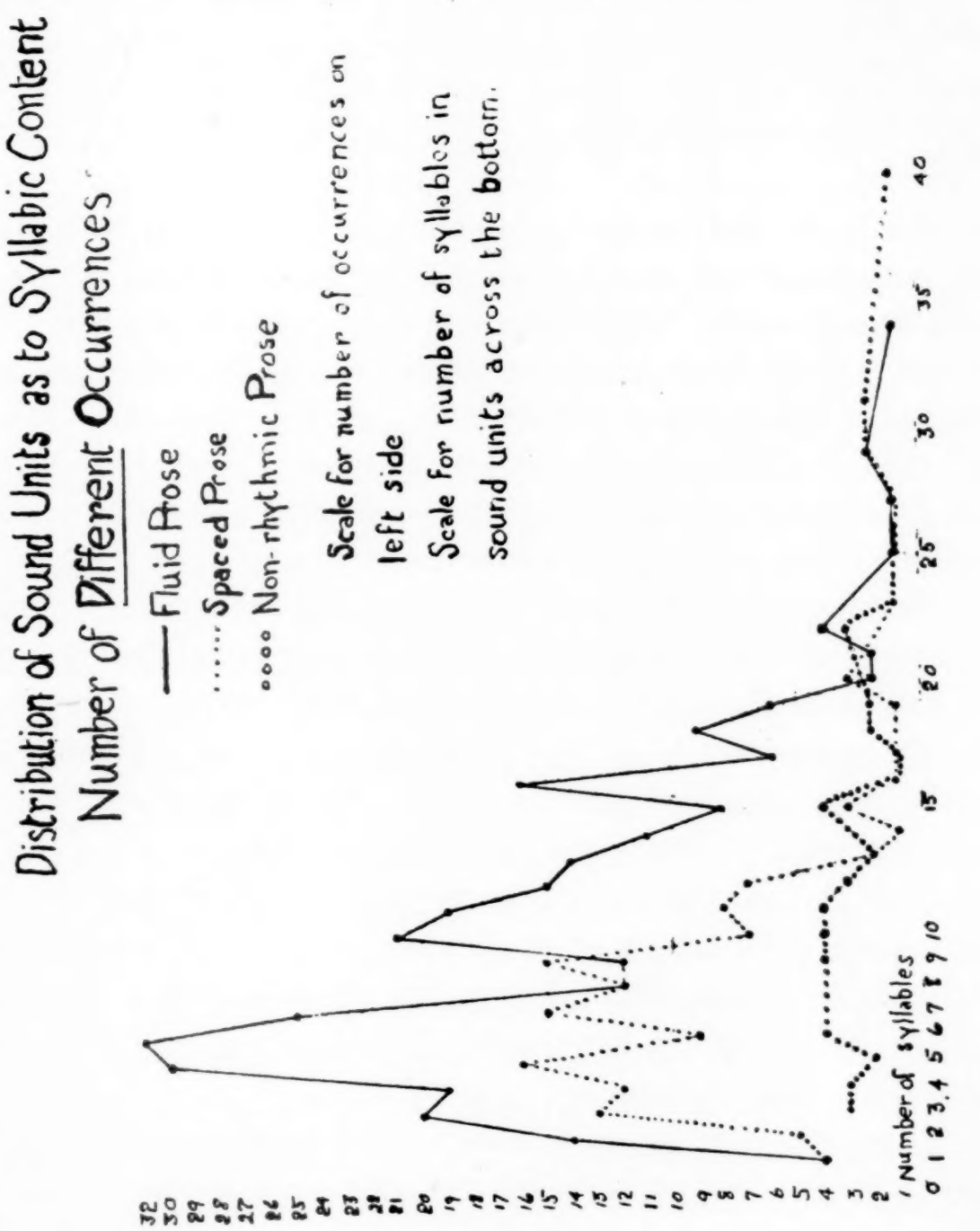
[22] This close relationship between blank verse and spaced prose bears out Middleton Murry's contention (*The Problem of Style*, p. 56) that "Spaced prose is the prose of a period when prose as prose had not yet found itself, when the rhythms of blank verse ringing in the ears of such men as Sir Walter Ralegh, Jeremy Taylor and Sir Thomas Browne established, however unconsciously, a sort of pattern for their more impassioned flights of prose. Great prose it undoubtedly is, but modern prose it is not. Prose has developed away from it."

as some of the passages were read by more readers than others, a preference would be given if only totals are considered to the syllable groups in the more frequently read passages. So while in Graph A, *Total Number of Occurrences,* all sound units are




represented, in Graph B, *Number of Different Occurrences,* page 41, sound units appearing in more than one reading of a passage are counted only once. The latter figures are unforunately not accessible for verse.

One notices in these graphs what one noticed in the tables for pause,—the more regular behavior of blank verse as compared with the other forms (here it is the rise in the curve for even syllable groups and a drop for the odd); a considerable regular-


GRAPH B
Distribution of Sound Units as to Syllabic Content
Number of Different Occurrences
— Fluid Prose
..... Spaced Prose
oooo Non-rhythmic Prose
Scale for number of occurrences on left side
Scale for number of syllables in sound units across the bottom.
Number of Syllables
0 1 2 3 4 5 6 7 8 9 10
15 20 25 30 35 40

ity in the behavior of spaced prose (the curve tends to rise for the odd syllables and drop for the even); still less regularity for fluid prose; and practically none for non-rhythmic prose.

Separated out and put in tabular form, the data on the preferred number of syllables in sound units appear as follows:

TABLE XI

Distribution of Sound Units as to Syllabic Content

| Material | Total number of sound units | Number of sound units containing odd number of syllables | Number of sound units containing even number of syllables | Number and percent of sound units of from 2 to 10 syllables inclusive |
|---|---|---|---|---|
| Non-rhythmic Prose. . . . . | 67 | 37 (55.22%) | 30 (44.77%) | 36 (53.73%) |
| Fluid Prose.... | 752 | 389 (51.72%) | 363 (48.27%) | 436 (57.97%) |
| Spaced Prose... | 185 | 107 (57.82%) | 78 (42.16%) | 145 (78.38%) |
| Blank Verse.... | 840 | 209 (24.88%) | 631 (75.11%) | 783 (93.21%) |

While the fluid prose sound units are seen to be by no means so haphazard and scattered as those of non-rhythmic prose, they are conspicuously longer than those of spaced prose and blank verse. Only 57.97 per cent belong to the groups made up of from 2 to 10 syllables, but 87.5 per cent belong to those made up of from 2 to 16. Again we see the greater range and flexibility of fluid prose and we infer that one difference between prose and verse rhythm is that prose employs more longer units.

The obvious preference of the verse for sound units containing an even number of syllables (75.11 per cent) is what one would expect from the iambic character of blank verse. But why the prose preference, if it is a preference, for the odd number of syllables? One can only speculate. Other passages may yield other results. Here, even in those few cases in which an even number is favored, the evidence seems to show that the larger even units are made up of smaller odd ones. For instance, in the 16 syllable groups of fluid prose the records show a tendency to break the group by lengthened syllables (see page 32) into a 5 and 11 syllable grouping.

These odd syllable groups may very possibly be preferred in prose because they lend themselves less well to the casual dropping into meter that comes so easily to our language. Good rhythmical prose is never metrical. The present figures, however, are not sufficient to base any conclusions upon. The matter should be looked into further.

What is not open to doubt is the preference shown in the

rhythmic prose studied for the 5 and 7 syllable groups. That it is peculiar to rhythmic prose only is shown by the curves of non-rhythmic prose in the two graphs. In both of them there is a fall for the 5 syllable group. To be sure, the 5's and 7's do not occur in prose with anything like the frequency of the 4 and 6 syllable groups in blank verse. 42.5 per cent of all the blank verse sound units are made up of groups of 4 and 6 syllables; only 20.06 per cent of the rhythmical prose sound units belong to the 5 and 7 syllable groups. Yet, as compared with other groupings, this 20.06 per cent does represent a preference and a preference for groupings that have been regarded as difficult.

Psychological literature on rhythm frequently reverts to the question as to whether groupings by 5's and 7's have rhythmic value. Bolton[23] says that at a slow rate grouping by 2's is most natural, at a more rapid rate a grouping by 3's and 4's, and at a still more rapid rate a grouping by 6's and 8's. 5's and 7's are never popular rhythms. MacDougall[24] says that 5's, 7's, and 9's become rhythms only when supplemented by a pause which is itself regarded as part of the measure. Swindle,[25] however, shows by his experiments that although rhythms of 2's and 3's and their multiples are more frequent and therefore more easily established (he suggests that their ease is because of our two-handed, two-legged, one-headed activities); nevertheless 5's, 7's, and 9's also furnish the feeling of rhythm once they have been established. He even got his adult observers to form 11 and 13 rhythms. He further points out that Tschaikowsky wrote musical measures of five elements. Modern music is making increasing use of 5's and 7's. Another experimenter with these groupings is Patterson.[26] Of his twelve observers, two failed to react to either group, two failed to react to 7's, and one to 5's.

[23] Bolton: *Rhythm.* Am. Jour. Psychol., VI:206.
[24] MacDougall: *The Structure of Simple Rhythm Forms.* Harvard Psychol. Studies. I:344.
[25] Swindle: *On the Inheritance of Rhythm.* Am. Jour. Psychol. XXIV:192.
[26] Patterson, op. cit., p. 160.

One observer reacted to both groups but found them both unpleasant. The remaining six reacted to both and enjoyed them.

Certainly the records of rhythmical prose here studied show no prejudice against 7 and 5 as rhythmical units.

## Recurrent Groupings

The differences observed in the graphs between the frequency curves for the number of different occurrences and those for the total number of occurrences is in part accounted for by the fact that there were more records of some passages than of others, and so, since the readers tended to agree in their groupings, the totals of groupings in the most frequently read sentences are therefore disproportionately large. And not only does this agreement of readers tend to run up the totals, but also the tendency in certain sentences for certain syllable groups to recur further increases them.

These recurrent groupings differ for different passages. But within a given passage of fluid or spaced prose the same syllable grouping tends to recur. For instance, in both readings of Passage 11, four out of the eight sound units are made up of groups of eight syllables each. For reader E the succession is 6, 12, 5, 5, 8, 8, 8, 8; for reader J it is 2, 4, 12, 10, 8, 8, 8, 8.

To illustrate more fully, I will give the syllable groupings for a few of the records read by five or more readers. The first five passages studied have been arbitrarily chosen for this purpose.

*Passage 8*

In the windless weather—
(Notice the 11's and 19's)

A 1: 6, 19, 19, 13, 3, 7, 11.
A 2: 6, 19, 19, 16, 7, 11.
B : 25, 19, 11, 5, 7, 11.
C : 25, 19, 11, 5, 7, 11.
D 1: 25, 19, 11, 5, 7, 11.
D 2: 25, 19, 11, 5, 7, 11.
E 1: 6, 19, 19, 16, 7, 11.
E 2: 6, 19, 19, 11, 2, 10, 11.
G : 25, 19, 13, 3, 7, 11.

*Passage 6*

It is the landscape—

A 1: 12, 7, 17.
A 2: 12, 7, 17.
B 1: 12, 7, 17.
B 2: 12, 7, 17.
C : 12, 7, 2, 7, 8.
D : 12, 7, 17.
E 1: 12, 7, 17.
E 2: 12, 7, 17.
G 1: 12, 7, 2, 12, 3.
G 2: 12, 7, 2, 15.

*Passage 19*

Product of a myriad—

(Notice the 16's)

A 1: 16, 13, 16, 16, 5.
A 2: 16, 13, 16, 16, 5.
A 3: 16, 13, 16, 21.
B : 16, 13, 16, 16, 5.
C : 7, 9, 13, 16, 21.
D 1: 16, 13, 16, 16, 5.
D 2: 16, 13, 16, 16, 5.
E 1: 16, 13, 16, 16, 5.
E 2: 16, 13, 16, 16, 5.
G : 16, 13, 9, 7, 16, 5.

*Passage 7*

The perfume of the little flowers—

A 1: 22, 29.
A 2: 22, 18, 11.
B : 13, 9, 18, 11.
C 1: 22, 18, 11.
C 2: 22, 18, 11.
D : 22, 18, 11.
E 1: 13, 9, 18, 11.
E 2: 13, 9, 18, 11.
G 1: 13, 9, 5, 13, 6, 5.
G 2: 13, 9, 5, 13, 11.

*Passage 17*

The blithe, crisp sentence,—

(Notice the 5's and multiples of 5)

A 1: 5, 12, 20, 15, 10, 5, 7, 4, 14, 3.
A 2: 5, 12, 10, 10, 15, 10, 5, 7, 4, 10, 7.
A 3: 5, 12, 20, 15, 10, 5, 7, 4, 17.
C : 5, 22, 8, 2, 15, 10, 5, 11, 10, 7.
D 1: 17, 20, 15, 10, 5, 7, 4, 17.
D 2: 17, 20, 15, 10, 5, 7, 4, 17.
E 1: 5, 12, 20, 15, 10, 5, 7, 4, 17.
E 2: 5, 12, 20, 15, 8, 2, 5, 7, 4, 17.
G : 5, 12, 4, 6, 10, 15, 8, 2, 5, 7, 4, 10, 4, 3.

It must be remembered in this connection that sound units containing the same number of syllables may be of very different lengths. In Passage 19, for instance, the 16 syllable groups vary in length from 11.77 to 23.95, a range of 12.81. The recurrence, therefore, probably does not make a time pattern, but this playing of numbers against time may very possibly be one of the elements (unanalyzed) that enter into our appreciation of the rhythm of the passage.

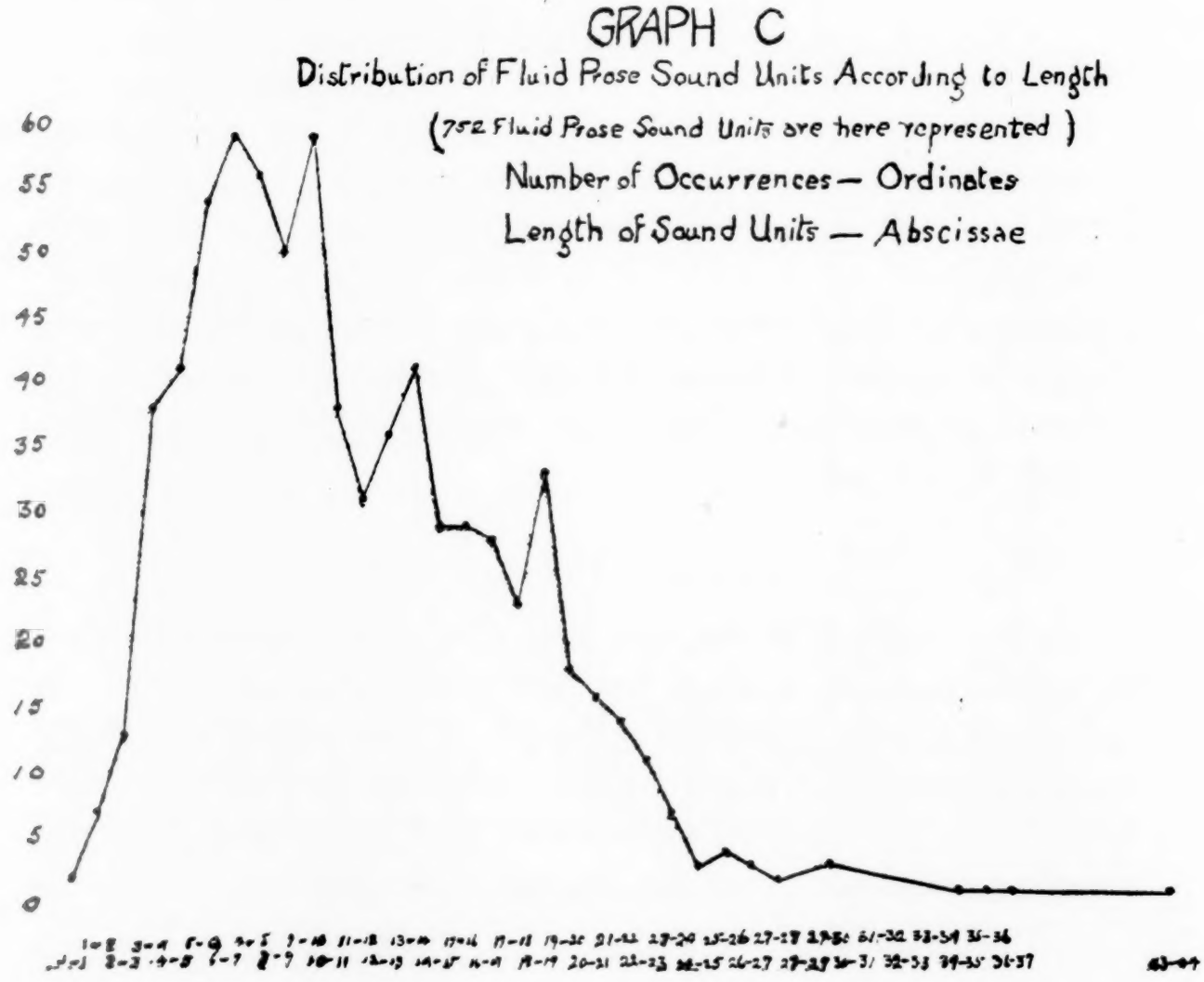
## Length of Sound Units

We now turn from the distribution of sound units according to syllabic content to their distribution according to length. In spite of the wide variations in length of any particular syllable grouping, certain lengths do tend to recur, as the following table will show. All the fluid prose sound units are here represented. Graph C, page 46, gives the frequency curve.

TABLE XII

Distribution of Sound Units According to Length

| Length | Number of sound units | Length | Number of sound units |
|---|---|---|---|
| .1 – 1. | 2 | 18 – 19 | 33 |
| 1 – 2 | 7 | 19 – 20 | 18 |
| 2 – 3 | 13 | 20 – 21 | 16 |
| 3 – 4 | 38 | 21 – 22 | 14 |
| 4 – 5 | 41 | 22 – 23 | 11 |
| 5 – 6 | 54 | 23 – 24 | 7 |
| 6 – 7 | 59 | 24 – 25 | 3 |
| 7 – 8 | 56 | 25 – 26 | 4 |
| 8 – 9 | 50 | 26 – 27 | 3 |
| 9 – 10 | 59 | 27 – 28 | 2 |
| 10 – 11 | 38 | .. – .. | .. |
| 11 – 12 | 31 | 29 – 30 | 3 |
| 12 – 13 | 36 | .. – .. | .. |
| 13 – 14 | 41 | 34 – 35 | 1 |
| 14 – 15 | 29 | 35 – 36 | 1 |
| 15 – 16 | 29 | 36 – 37 | 1 |
| 16 – 17 | 28 | .. – .. | .. |
| 17 – 18 | 23 | 43 – 44 | 1 |
| Total number of sound units | | | 752 |



It is seen that the two most frequent lengths are from 6 to 7 and from 9 to 10. In terms of seconds they are from 1.2 to 1.4 and from 1.8 to 2. These are all longer than the one second which is often given as about the normal period of a wave of attention,[27] a period, however, determined by response to simple stimuli.

Does that mean that they are too long to be felt as rhythmical units? For help in answering this question we turn to the results of psychological experiments in rhythmical grouping.

## Limits of Rhythmical Grouping

What we find is disappointing. For although psychologists have made various laboratory studies of rhythm,[28] very few of their findings apply to our question. Most of the work on the subject has been done with mechanical elements,[29]—the ticking of an electric key, hammer strokes, flashes of light, and musical notes. More rarely has language been used. Much of it has concerned itself with determining how far apart two sounds may be before they cease to be perceived as a rhythmic group. What we want to know is not how far apart the elements of a rhythmic group may be but how many elements may be held together in a single rhythmic impression and what may be the time limit for such a filled interval.

Dietze's[30] work comes nearer answering our questions than any other, for although he used metronome beats, one of his purposes was to discover how many beats could be held in a single rhythmic impression. He found that as many as forty could be so held if they were thought of as eight groups of five. If thought of as

[27] Bolton, op. cit., p. 216.

[28] The work of Bolton, Dietze, Hurst and McKay, MacDougall, Meumann, Stetson, Smith, Scripture, Wundt, and others is here referred to.

[29] Meumann in his *Der Rhythmus des gesprochenen Verses* (the second part of his *Untersuchungen zur Psychologie und Aesthetik des Rhythmus,* Wundt's Philosoph. Stud., vol. X, p. 427), takes Bolton to task for assuming that the conclusions reached for simple sounds can be transferred without qualifications to language.

[30] Dietze, *Untersuchungen über den Umfang des Bewusstseins bei regelmässig aufeinander folgenden Schalleindrücken,* Wundt's Philos. Stud., II: 362–393, 1885.

in two's, sixteen groups of two each are the most that can be held. James[31] arrives at an outside time limit of rhythmical impression by multiplying Dietze's forty beats by 0.3 second, which is the interval Dietze and others found especially favorable to the grouping of long series. The resultant twelve seconds is considerably longer than the duration of any of our sound units; the longest, the 34 syllabled fluid prose one that measured 43.3, is, in terms of seconds, 8.64 seconds long. Add to this the probability that when language is the material of the rhythmic impression, the limits of rhythmical grouping would be extended because its richer content and more complex character furnish additional aids in grouping, and we see that there is no difficulty so far as length goes in thinking of any of our sound units as making a single rhythmic impression. On the side of number we find that only one sound unit is made up of as many as forty elements, if we may call syllables elements.

But like the forty metronome beats, these units are held as wholes from being thought of in parts. A study of some of the longer sound units that were felt to be especially rhythmical will better illustrate what I mean.

## Analysis of Certain Long Sound Units Regarded as Rhythmical

On page 35 it was pointed out that uniformity among readers in breaking up the flow of speech is really greater than the figures for the uniform placing of pause indicate, because a lengthened syllable takes the place of pause for some readers and for others longer pauses mark off the larger unit which may itself be broken up by much shorter pauses not made by the first readers. And now it is suggested that the longer units are felt as rhythmical because of the way in which they are thought of as a group of smaller units.

Here it becomes especially difficult to limit myself, as I have tried to do, to the single element of time. There are so many aids to grouping within the sound unit. Stress and pitch are very

[31] James, *Principles of Psychology*, I: 613.

possibly of primary importance here; assonance and everything else that goes into our concept of tone-color play a part. But time both as progression (see Chapter IV) and as duration are important, too. A study of the lengthened syllables in itself tells much about these smaller groupings.

Therefore some of the longer sound units are given with their syllable lengths. The places where other readers broke up the passages with pause are marked with triangles. The pauses setting off the special readings given are enclosed in parentheses:

(1) 29 Syllable Group (From Passage 7 of which there are 9 records in all. Reader A is the only one to make this a single sound unit.)

| | While | time | seemed | to | move | △ | ev-er | more | slow-ly | to | the |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (2.7) | 1.3 | 2.4 | 1.4 | .4 | 1.6 | .8 | .5 | 1.3 | 1.5 | .8 | .65 | .4 |
| | mur-mur | of | bees | in | it | △ | till | it | al-most | stood | still | △ | on | June |
| | .8 | 1.9 | .35 | 1.8 | .9 | .6 | 2.6 | 1.2 | 1.1 | 1.45 | 1.7 | 2. | .7 | 1.2 |
| | af-ter-noons. | | | | | | | | | | | | | |
| | .9 | .5 | 3. | | | | | | | | | | | |

The other readers broke up this sentence in the following way: A pause after *it* in all the other readings; a brief pause after *move* in two; and a brief pause after *still* in one.

Here it is not the expected pause after *it* that is lengthened, for the *in it* is logically unimportant and necessarily clipped. But the syllable after *it, till,* is longer in this record than in any of the other eight records in which a pause is made before it, and it is within .012 of a second as long as the average of A's five nonsense readings of it.

*Still* is the longest word in the clause, ***till it almost stood still,*** in 6 out of the 9 records.

(2) 27 Syllable Group (From Passage 14 of which there are 9 records in all. Readers A, J, and M are the three to make this a single sound unit.)

| | | Set | it | for | a | mom-ent | be-side | one | of | those | white |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | (10.05) | 1. | .72 | 1.05 | .4 | 1.2 | .8 | .5 | 1.3 | .85 | .65 | .88 | 1.93 |
| J | ( 4.2 ) | 1.3 | .8 | 1.2 | .8 | 1.3 | .5 | .6 | .7 | .7 | .5 | .6 | 1.7 |
| M | ( 4. ) | 1.7 | .9 | 1. | .5 | 1.7 | .9 | .5 | 1. | .8 | .5 | 1.4 | 1.7 |

| | Greek | godd-ess | - es | △ | or | beaut - i - ful | wom - en | of | an - tik- |
|---|---|---|---|---|---|---|---|---|---|
| A | 1.5 | 1.4 | .8 | 1.2 | .8 | 1. | .36 | .85 | 1. | .36 | .45 | .8 | 1.56 |
| J | 1.3 | .4 | .5 | .8 | .5 | .9 | .5 | .7 | .6 | .5 | .8 | 1. | 1.1 |
| M | 1.4 | 1.2 | 1. | 1.2 | .9 | 1. | .5 | 1.3 | .8 | .6 | .7 | .7 | 1.4 |

| | qui - ty, | |
|---|---|---|
| A | .26 | 1.67 (2.25) |
| J | .6 | 1.2 (2.3 ) |
| M | .5 | 1.4 (1.9 ) |

In another record made by A he paused after *goddesses.* He read it godd-ess-es (pause) or, etc. Here the syllables before
1.4 .9 .8 2.6 .6
and after the pause are shorter than when he read them without pause. (A's average syllable length for fluid prose is 1.12.)

This pause after *goddesses* occurs in six out of the nine records.

(3) 25 Syllable Group (From Passage 8 of which there are 9 records in all. Readers B, C, D, and G are the four to make this a single sound unit.)

| | In | the | wind | - | less | weath | -er | all | seemed | to | be | list | - | ning | to | the |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B | 1.1 | .7 | 2.1 | | 1.4 | 1.6 | 1.3 | 1.6 | 1.9 | .9 | 1.2 | 1.7 | | 1.3 | .6 | .8 |
| C | 1.5 | .67 | 1.15 | | 1.5 | .9 | .8 | 1.9 | 2. | .6 | .7 | 1.3 | | 1.85 | .9 | .85 |
| D1 | .7 | .7 | 1.4 | | 1.3 | .9 | 1. | 1.8 | 1.85 | .3 | .8 | 1.2 | | .9 | .4 | .65 |
| D2 | .6 | .5 | 1.7 | | 1.3 | 1. | 1.1 | 1.3 | 1.9 | .3 | .8 | 1.4 | | 1.1 | .3 | .7 |
| G | 1. | .5 | 1.6 | | 1.3 | 1.6 | 1.7 | 2. | 1.3 | .6 | .8 | 1.65 | | 1.55 | .6 | .84 |

| | roar | of | the | imm | - | e | - | mor | - | i | - | al | wat | - | er | - | fall | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B | 2.3 | .8 | 1.2 | .9 | | 1. | | 1.06 | | .3 | | .5 | .8 | | .8 | 2.1 | | (3.8) |
| C | 3. | .5 | .45 | .84 | | .46 | | 1.7 | | .7 | | .8 | 1. | | .57 | 3.1 | | (1.4) |
| D1 | 2.1 | .6 | .8 | .7 | | .3 | | 1.2 | | .4 | | .9 | .9 | | .4 | 1.7 | | (1.7) |
| D2 | 1.9 | .5 | .8 | .7 | | .4 | | 1.8 | | .3 | | .3 | .8 | | .7 | 1.7 | | (1.7) |
| G | 2.45 | .4 | .7 | 1.3 | | .6 | | 1.4 | | .4 | | .7 | 1.2 | | .65 | 3. | | (2.7) |

This passage is of special interest to us because in only four out of the nine records is there any pause within these twenty-five syllables. (In those four a pause comes after *weather.*) Yet all the readers rated the passage as highly rhythmical. One of the readers in marking the passage afterwards treated this group as a single unit; another put a secondary pause after *weather,* and still a third indicated pauses after *weather,* after *listening,* and after *roar.* All three had read it as a single sound unit.

Though the twenty-five syllables are held as a whole, it is clear that they are held in phrase groups. The lengthening of certain sounds, changes of pitch and tone color, all serve the purpose of breaking the sound unit into smaller rhythmic sections. The repetition of the *or* sound in *roar* and imme*mor*ial and the recurrent l's and r's, for instance, help to do this and add greatly to the musical impression of the whole. Printed in grammatical phrases, the sound unit breaks up as follows:

In the windless weather
all seemed to be listening
to the roar
of the immemorial waterfall

The lengthening of the light final syllable of *weather* and *listening* sets off the phrasing. But the greatest rhythmical break in the passage comes rather at *roar,* where the sense does not allow of pause. It is the longest syllable in the unit for B and D1. For D2 *seemed* and *roar* are of the same length, and for C and G *roar* is second in length to the final syllable of the sound unit.

(4) 22 Syllable Group (From Passage 7 of which there are 9 records in all. Readers A and C make this a single sound unit in two records each.)

| | The | per | - | fume | of | the | litt | - | le | flow | - | ers | of | the | lime-tree△ | fell | through |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | .5 | 1.4 | | 1.8 | .4 | .8 | .8 | | .6 | 1.5 | | .8 | .5 | .8 | 1.9 | 1.9 | 1.9 | .65 |
| A2 | .5 | 1.3 | | 1.7 | .4 | .5 | .8 | | .7 | .9 | | 1.6 | .4 | .5 | 2. | 2.3 | 2.2 | .6 |
| C1 | .9 | 2. | | 3. | .4 | .8 | .85 | | .8 | 2.2 | | 1.2 | .4 | .6 | 2.2 | 3.1 | 3.4 | 1.8 |
| C2 | .7 | 2.1 | | 3.1 | .6 | .7 | .5 | | .6 | 1.8 | | 1 | .4 | .7 | 2.1 | 2.6 | 2.4 | 1.3 |

| | the | air | up | - | on | them | like | rain | |
|---|---|---|---|---|---|---|---|---|---|
| A1 | .4 | .8 | .5 | | 1. | 1.1 | 2.1 | 2.7 | (2.7) |
| A2 | 1.8 | 1.1 | .6 | | 1.3 | .8 | 1.3 | 3.7 | (2) |
| C1 | .8 | 2.5 | .4 | | 1.4 | 1.5 | 1.5 | 4.3 | (1.9) |
| C2 | 1.4 | 3.2 | .4 | | 1.7 | 2.5 | 1.6 | 3.4 | (2.7) |

In five out of the nine records and for four out of the six readers there is a pause after *lime-tree.* In the remaining four records given above it is seen how the time is stretched out for the three long syllables, *lime, tree,* and *fell,* and how *tree* is the longest syllable of the phrase to which it belongs in three of the records and the same length as *lime* in the fourth.

Further evidence that these longer sound units are wholes only by virtue of being thought of in parts is given by the fact that the longer sound units show less temporal stability than the shorter ones.

## Temporal Stability

Temporal stability is evidenced by the more regular behavior which some sound units show both as regards their duration (here considered in relation to the number of syllables contained in the unit and shown by the average of syllable length) and the length of the pauses that set them off. There is a tendency to say more slowly[32] and to set off by longer pauses units that are felt

[32] That is, the temporal length of the sound unit *as a whole* is relatively longer. Individual syllables within the unit are said at widely varying rates. See Chapter IV.

strongly as units. This may very well be, in part at least, to give us more time in which to get the finer shadings of stress, pitch, and tone color that play so large a part in the total rhythmic effect. Just as we tend to read material printed as verse more slowly, feeling for some underlying beat or pattern, than we do the same material printed as prose, so in prose we seem to read more slowly those units in which we feel some ordered arrangement or movement. The more stable sound units and, we hazard a guess, the more rhythmic are thus either relatively longer than the less stable ones or they are set off by longer pauses, or both.

To be sure, it is true that, other things being equal, longer sound units are spoken more rapidly than shorter ones (see page 63) and are set off by longer pauses.[33] And yet, as we have seen (page 45), sound units of the same syllabic content may vary widely in length. We should expect, however, those that are rhythmically strongest to possess the greatest temporal stability; that is, to stand out most firmly as units.

Whether they do or not may be observed from the following table, which gives for each syllable group the length of the sound unit and of the succeeding pause.

An examination of the sound unit lengths of this table shows the greatest irregularity in time for the sound units of non-rhythmic prose. The length of the unit seems to bear no regular relation to the number of syllables in it. Longs and shorts follow one another at haphazard. Also the pauses after the non-rhythmic prose units are irregular and erratic.

The sound units of rhythmic prose and blank verse, on the other hand, tend to lengthen up to a certain point, after which irregularity sets in. For blank verse the regularity lasts only through the 10 syllable group; for spaced prose through the

[33] Bolton (op. cit., pp. 214–216) explains the greater relative length of his smaller rhythms by the fact that people are more accustomed to them and therefore take them in easy, leisurely fashion. The relatively greater length of the shorter sound units in speech may also be explained in part by this sense of ease given by the short, quickly comprehended syllable group, but probably even more by the reason given above, our need for time in which to become aware of the nicer details of the pattern.

TABLE XIII

TABLE XIII

Relation of Length of Sound Unit and of Succeeding Pause to Syllabic Content

| Number of syllables in sound unit | Average length of sound unit in one-fifth seconds: Non-rhythmic prose | Fluid prose | Spaced prose | Blank verse[34] | Average length of pause following sound unit: Non-rhythmic prose | Fluid prose | Spaced prose | Blank verse[34] | Range in time of pause following sound unit: Non-rhythmic prose | Fluid prose | Spaced prose | Blank verse[34] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 1.37+ | 2.04— | 3.05 | | .93 | .95 | 1.15 | | .5 – 1.3 | .56–2.26 | .35–2. |
| 2 | | 3.27 | 3.07+ | 3.8 | | 1.49 | 1.86+ | 1.75 | | .47– 3.85 | 1.35–2.65 | .35–2. |
| 3 | 3.53 | 4.56 | 4.60+ | 3.5 | 1.30— | 1.41 | 2.12— | 1.85 | .3 –2.78 | .36– 3.5 | .43–3.8 | .35–4. |
| 4 | 4.91 | 5.07 | 5.94+ | 7.05 | .93— | 1.69— | 1.88— | 2.10 | .7 –1.2 | .31– 4.36 | .3 –3.5 | .5 –5. |
| 5 | 5.23 | 8.08 | 6.4 — | 7.2 | 1.69 | 1.63+ | 2.39+ | 2.25 | 1.41–1.97 | .47– 3.35 | .4 –4.4 | .5 –4.25 |
| 6 | 5.28 | 8.02 | 7.21— | 9.5 | 1.28 | 2.95— | 1.67+ | 2.75 | .6 –2.25 | .4 –10.05 | .6 –4.3 | .3 –5.5 |
| 7 | | 7.96 | 8.29+ | 11.25 | | 1.78— | 2.50— | 2.60 | | .3 – 3.63 | .8 –5.9 | .4 –6.25 |
| 8 | | 9.19 | 9.57+ | 12.4 | | 2.03+ | 2.56+ | 2.60 | | .7 – 4.1 | .9 –6.4 | .5 –4. |
| 9 | 10.28 | 10.7 | 11.03— | 13.9 | 5.80— | 2.18— | 2.63— | 1.80 | 4.72–6.65 | .4 – 5.52 | 1.4 –5.2 | .5 –4. |
| 10 | 9.41 | 11.12 | 12.36+ | 14.45 | 1.98— | 2.08— | 2.07— | 2.65 | 1.2 –2.6 | .4 – 6.25 | .72–3.4 | .5 –6.5 |
| 11 | 12.3 | 13.13 | 12.50— | 11.8 | 4.95 | 2.21+ | 2.85— | 1.65 | 4.5 –5.4 | .3 – 3.5 | .65–5.86 | 1. –2. |
| 12 | 12.37 | 13.82 | 14.82 | 19.3 | 1.67+ | 2.30+ | 4.04— | 2.35 | .3 –3.02 | .7 – 5.4 | 2.4 –9.7 | .5 –4. |
| 13 | 14.71 | 15.26 | 15.97 | 16.5 | .79 | 2.42+ | 2.36 | 1.80 | | .8 – 4.6 | 1.6 –3.2 | 1.5 –2.5 |
| 14 | | 15.71 | 12.95 | 18.6 | | 2.37— | 3. | 2.75 | | .65– 4.5 | | .9 –4. |
| 15 | 16.51 | 17.46 | 18.09— | 19.5 | 2.54+ | 2.27+ | 4.26+ | 2.25 | 1.8 –2.91 | 1.2 – 3.3 | 3.22–6.61 | 2. –2.5 |
| 16 | | 18.26 | 18.81 | 20.35 | | 2.36+ | .4 | 3. | | .6 – 4.41 | | 2. –3.5 |
| 17 | 18.85 | 19.19 | 15.17 | | 1.53 | 2.28— | 3.53— | | | .6 – 4.48 | 3.4 –3.65 | |
| 18 | 16.34 | 19.7 | | 25. | 1.2 | 2.64— | | 1. | .8 –1.6 | 1.07– 4.1 | | |
| 19 | 20.05 | 21.26 | 19.41 | | 1.00— | 2.52+ | 1.9 | | .85–1.2 | .87– 3.7 | | |
| 20 | | 22.85 | 20.05 | 18.5 | | 3.47— | 1.5 | 3.5 | | 2.15– 5.3 | .7 –2.3 | |
| 21 | | 21.06 | | 20. | | 4.2 | | .5 | | | | |
| 22 | 22.55 | 23.54 | | | 1.62— | 2.65+ | | | .67–2.07 | .9 – 4.68 | | |
| 23 | 24.7 | | 25.68 | | 3.19 | | 3.06 | | .79–6.88 | | | |
| 25 | 24.6 | 27.49 | | | | 2.26 | | | 1.4 –3.8 | | | |
| 27 | | 25.82 | | | | 2.15 | | | 1.9 –2.3 | | | |
| 29 | | 31.07 | | | | 3.46 | | | | | | |
| 31 | 29.29 | | | | .62— | | | | .55– .68 | | | |
| 34 | | 43.3 | | | | 4.1 | | | | | | |
| 40 | 37.5 | | | | 1.3 | | | | | | | |

[34] Snell, op. cit., p. 52.

13 syllable group, and for fluid prose through the 20 syllable group. We know that the 10 syllable group is the largest rhythmic unit in blank verse. May we not therefore assume that the largest rhythmic unit for the spaced prose studied is the 13 syllable group and for fluid prose the 20?

The pauses after the rhythmic prose and blank verse sound units tend to increased length as the syllabic length of the sound units increases up to a certain point, after which irregularity sets in. For blank verse—though with the exception of the pause after the 6 syllable group, which is relatively longer than the others, and that after the 9 syllable group, which is relatively shorter, there is an increase in pause length up through that after the 10 syllable group—the sharpest rises in length of pause come after the 2, 4, 6, and 10 syllable groups, all of them groups of rhythmic importance in blank verse. The sharpest rises in the sound unit length come for the 4 and 6 groups, numerically and rhythmically the preferred groups.

For spaced prose the pauses after the groups made up of an odd number of syllables are relatively longer than those after the even numbered ones, showing the odd syllable groups to be more stable and, if we accept the analogy with verse, probably more rhythmic. After the 11 syllable group is passed the pauses in spaced prose also become irregular. In fluid prose the general tendency to a relative lengthening of pause lasts through the pause after the 21 syllable group. The groups that are longer for prose than for verse are the 3, 5, 11, 20, and 21 syllable groups. All the others are longer for verse.

The two conclusions that finally emerge from a study of this table are that temporal stability extends up through longer sound units for fluid prose than for the other forms, and that the groups that recur most frequently (see present study, pp. 39–44) are also those that are most stable. These groups would seem, then, from their constitution and behavior, to be rhythmical units, and as such to form one of the time patterns of prose.

## Summary of Chapter III

1. The sound unit, a word or group of words set off by pause, is what establishes the phrase rhythm of a passage. That prose has such a rhythm is the thesis of this chapter.

2. No sound unit in rhythmical prose was found of too great temporal length to be held as a single rhythmic impression.

No sound unit in rhythmical prose was found containing too many syllables to be held as a single rhythmic impression.

For this single rhythmic impression of a long sound unit it is necessary that it be susceptible of groupings within itself. The lengthened syllable was found to be the temporal means by which such groupings were made. Pitch, stress, and tone color all may reinforce the work of the lengthened syllable or possibly initiate it.

3. The rhythmical prose studied showed a preference for sound units containing an odd number of syllables, particularly for 5's and 7's. These do not recur, however, to anything like the same extent as do the 4's and 6's for blank verse; but they show, like those in verse, considerable temporal stability.

4. The relationship of the different kinds of prose to one another and to blank verse may be roughly indicated by the following arrangement of numbers, an arrangement in which *1* represents blank verse, *2* spaced prose, *3* fluid prose, and *4* non-rhythmic prose: 1 - *2* - - 3 - - - 4. That is, spaced prose is more like blank verse than it is like fluid prose; fluid prose is more like spaced prose than it is like non-rhythmic prose.

5. Spaced prose is like blank verse in that its average sound unit is only 1.12 syllables longer than that of blank verse (*2.26* syllables shorter than fluid prose); that the range in number of syllables is only *2* more than that of blank verse (11 syllables less than that for fluid prose); that the span of the range in the speaking time for spaced prose sound units is within .38 (.076 of a second) of that for blank verse. So far as the average time of the sound unit goes, spaced prose is again closer to blank verse than to fluid prose. Only here, as well as in the matter of the median length of sound unit and the sound unit of most frequent length, spaced prose would be 1 in the series and blank verse *2*.

Spaced prose is also like blank verse in that the temporal stability of its sound units does not extend to the longer sound units. For blank verse it extends only through the 10 syllable group; for spaced prose, through the 13 syllable group.

The kinship between the two has already been shown in the matter of pause:—how they contain approximately the same amount; how they both lack the greater variety of fluid prose pauses; how they both show less difference between the pauses within the sentence and those at the end than fluid prose does; how the average length of the spaced prose pause is even longer than that for blank verse, though the pause of most frequent occurrence is one-tenth of a second shorter.

6. Non-rhythmic prose at the other end of the line resembles fluid prose in its greater range in the number of syllables in the sound unit. It differs from fluid prose by its more rapid reading, its fewer and shorter pauses, its longer sound units; by the absence of any most frequent length, temporal or syllabic, and by the absence of regularity in the relation of temporal length of sound unit and length of pause to the number of syllables in the sound unit, that is, by the absence of any temporal stability of sound units.

7. Fluid prose differs from non-rhythmic prose in the regularity and stability of its widely ranging sound units and pauses. As great uniformity in the placing of pauses appears in fluid prose as in blank verse. Up through the 20 syllable group the length of the sound unit and of the succeeding pause bear a regular relation to the number of syllables in it.

On the other hand, fluid prose differs from spaced prose and blank verse by reason of the greater variety and flexibility in the length and placing of pause. This difference is what makes its rhythmic time pattern less a matter of duration than of changes in rate.

These changes in rate will be taken up in the next chapter.

# CHAPTER IV. RATE

## Introductory

Chapters II and III showed that fluid prose possesses a greater variety in the length and content of its sound units and in the length of its pauses than is possessed by spaced prose and blank verse, and that this variety is accompanied by a marked degree of regularity and stability, thereby distinguishing fluid prose from non-rhythmic prose. It now remains to show how this greater variety in length and content of sound unit and in length of pause affects the movement of the prose, how the changes from sound unit to sound unit in syllable number, in lengths, and in rate give the sentence its propulsive force. These changes start a progression that carries us along with it; we feel that something is impending; we recognize it when it comes, or miss it when it fails to come. In one of its aspects we have this sense of progression in the so-called figure of climax, logical as well as rhythmical progression being involved. Its absence is one of the chief characteristics of what is known as *text-book style,* a lifeless style in which there is no variety, no anticipation, no suspense.

The plan of this chapter is to study first the larger movement or progression from sound unit to sound unit of the fluid prose sentence as regards number of syllables and speaking time, and secondly the progression of syllables within the sound unit from slower to faster and from faster to slower.

## Sentence Movement

What one notices about the well-built sentence is that once started it moves on of its own momentum. Like a ball thrown by a professional, the turn given it at the start determines not only its end but the direction and curve by which it reaches that end.

Flowing line rather than recurrent pattern is the characteristic

of good fluid prose, a symphonic rather than an antiphonal rhythm. Spaced prose, on the other hand, like verse, is distinguished by recurrent pattern,—in prose a phrase pattern, in verse a foot pattern. Middleton Murry, the English critic, says of the prose of Elizabeth's day—of spaced prose, that is—that with all its sonorous beauty "it has not the flexible, non-insistent rhythm that is proper to prose in the pink of condition; it has not the lithe glancing movement, swiftly and secretly advancing, which is characteristic of prose." [35]

This lithe glancing movement so characteristic of fluid prose we commonly refer to as the *swing* of a sentence, and by that we mean the momentum that carries us along, or as Patterson has put it, "The sense of swing means nothing unless it be a sense of progressive movement." [36] And this sense of progressive movement is caused, as we think, by progressive changes in *tempo* and the temporal length and syllabic content of sound units. That these three have a certain connection we have already observed.

All these changes may be observed in detail in the passages given below. More material on changes in syllable number can be found on pages 44–45. The passages here given, 19, 7, 8, and 6, were chosen as illustrative of different types of movement.

For all four passages are given, first, the number of syllables in the successive sound units; secondly, the absolute length of the sound units; thirdly, the rate at which the syllables are spoken; that is, how many, how long, how fast. The lengths of the pauses following the sound units are also given.

TABLE XIV

Passage 19 (Product of a myriad various minds . . .)

| | | | | | | |
|---|---|---|---|---|---|---|
| Number of syllables in sound units | | 16 | 13 | 16 | 16 | 5 |
| Length of sound unit | A1 | 18.95 | 13.95 | 17.6 | 12.65 | 7.35 |
| | A2 | 18.5 | 14.5 | 16.45 | 11.85 | 3.7 |
| | B | 21.1 | 21.5 | 19.65 | 15.1 | 7.05 |
| | D | 18.05 | 14.45 | 18.2 | 11.77 | 6.08 |
| | E1 | 18.1 | 15. | 18.95 | 13.69 | 6. |
| | E2 | 19.5 | 14.59 | 18.64 | 14.35 | 6.3 |

[35] Murry: *The Problem of Style*, p. 56.
[36] Patterson, op. cit., p. 51.

| | | | | | | |
|---|---|---|---|---|---|---|
| Average syllable rate within sound unit | A1 | 1.18 | 1.197 | 1.1 | .79 | 1.47 |
| | A2 | 1.156 | 1.115 | 1.028 | .74 | .74 |
| | B | 1.318 | 1.65 | 1.228 | .943 | 1.41 |
| | D | 1.128 | 1.11 | 1.137 | .735 | 1.216 |
| | E1 | 1.13 | 1.15 | 1.18 | .855 | 1.2 |
| | E2 | 1.218 | 1.122 | 1.165 | .896 | 1.26 |
| Length of succeeding pause | A1 | 4. | 1.8 | 1.9 | .7 | |
| | A2 | 3.8 | 2.4 | 2.85 | 3.4 | |
| | B | 2.75 | 2.5 | 2.6 | 2.1 | |
| | D | 1.6 | .9 | 2. | 1.15 | |
| | E1 | 2.6 | 2.3 | 1.9 | 1.2 | |
| | E2 | 2.7 | 2.9 | 2.3 | 1. | |

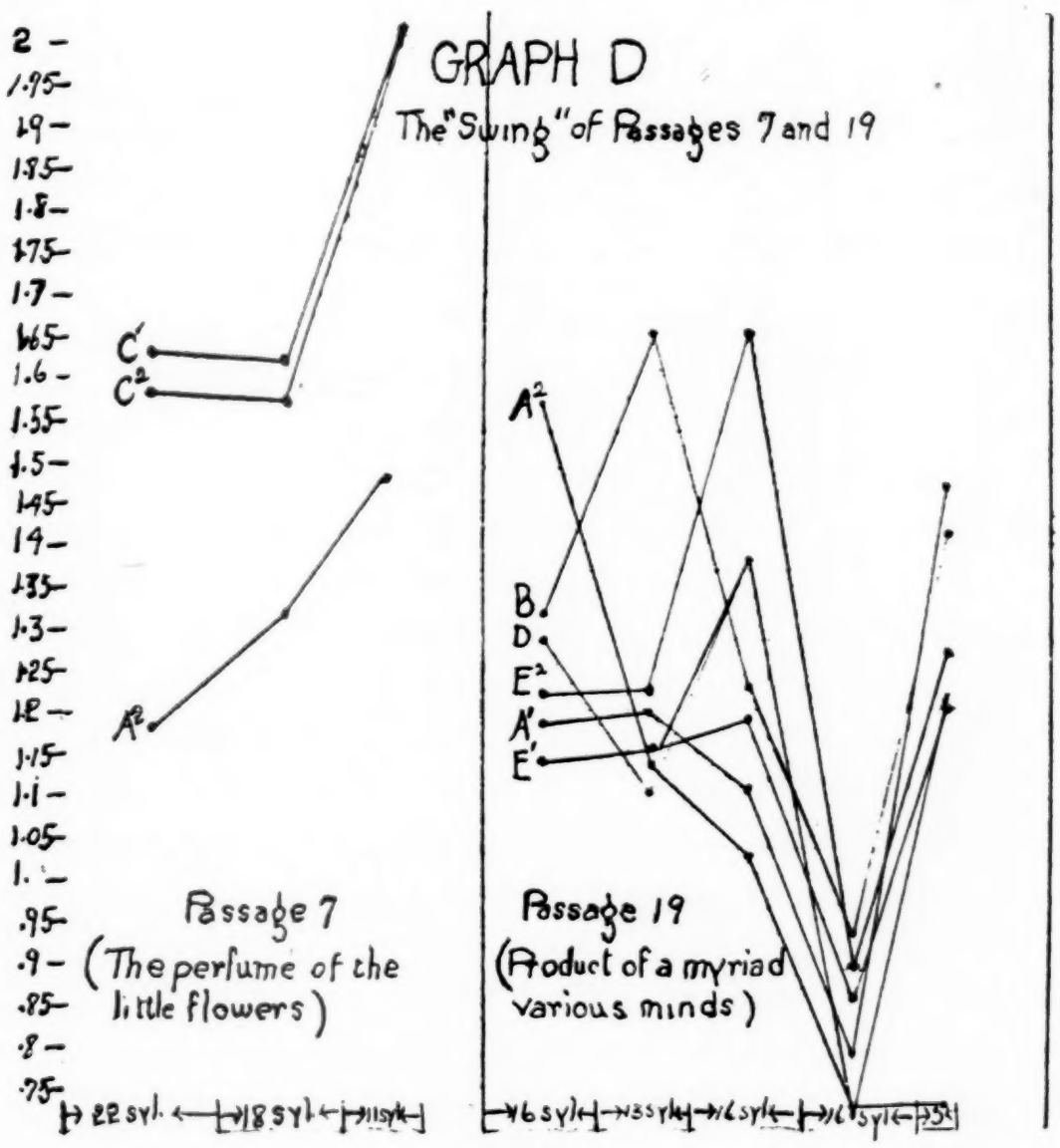



TABLE XV

Passage 7 (The perfume of the little flowers . . .)

| | | | | |
|---|---|---|---|---|
| Number of syllables in sound units | | 22 | 18 | 17 |
| Length of sound unit | A2 | 26. | 23.65 | 16.2 |
| | C1 | 36.05 | 29.22 | 22.1 |
| | C2 | 34.8 | 28.1 | 22.7 |

| | | | | |
|---|---|---|---|---|
| Average syllable rate within sound unit | A2 | 1.18 | 1.31 | 1.47 |
| | C1 | 1.638 | 1.62 | 2.009 |
| | C2 | 1.58 | 1.56 | 2.06 |
| Length of succeeding pause | A1 | 2. | 1.2 | |
| | C1 | 1.9 | 2.5 | |
| | C2 | 2.7 | 2.6 | |

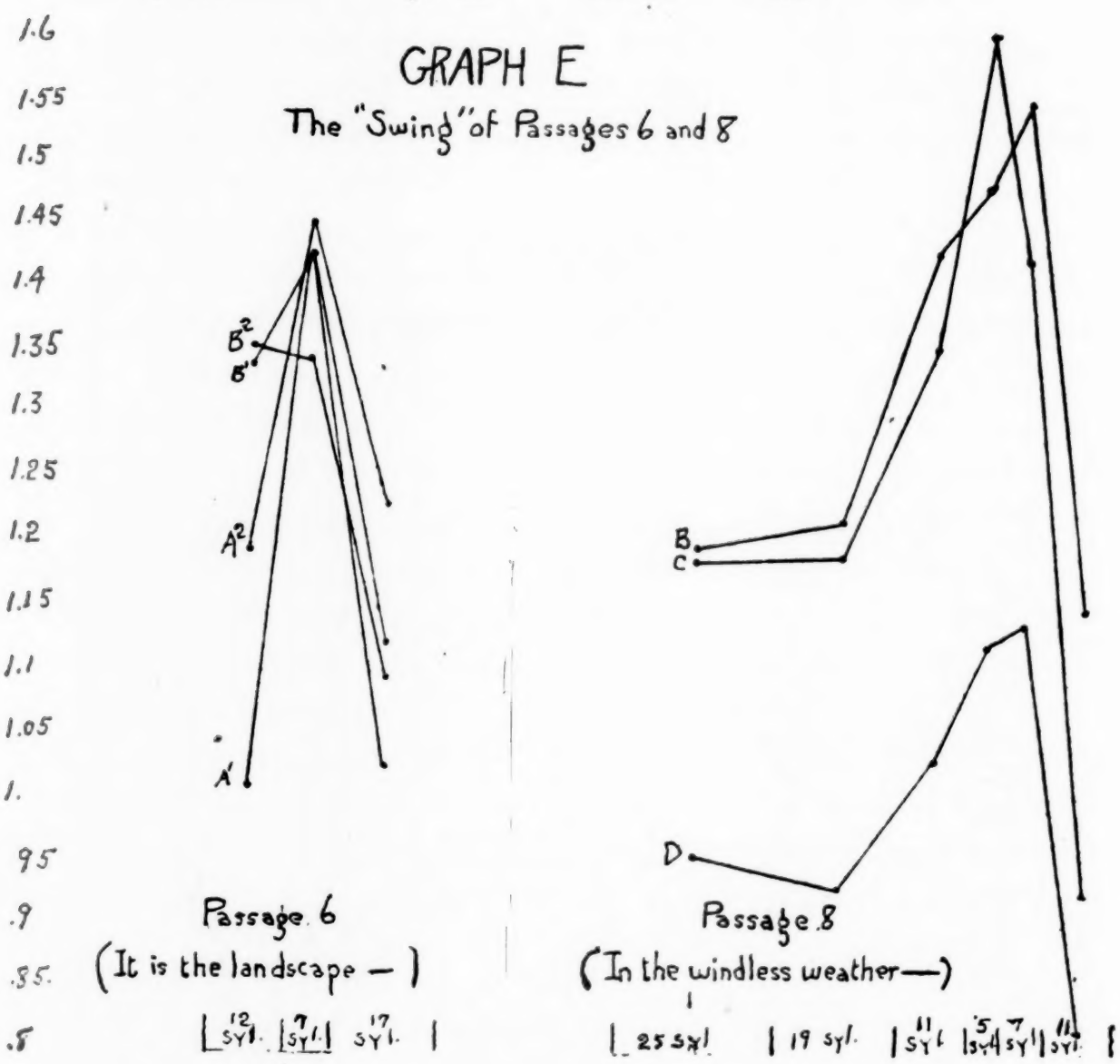



TABLE XVI

Passage 6 (It is the landscape, not of dreams . . .)

| | | | | |
|---|---|---|---|---|
| Number of syllables in sound units | | 12 | 7 | 11 |
| Length of sound unit | A1 | 12.14 | 10. | 17.45 |
| | A2 | 14.35 | 10.19 | 20.9 |
| | B1 | 16.1 | 10. | 19.05 |
| | B2 | 16.35 | 9.44 | 18.8 |
| Average syllable rate within sound unit | A1 | 1.011 | 1.428 | 1.026 |
| | A2 | 1.195 | 1.451 | 1.23 |
| | B1 | 1.341 | 1.428 | 1.12 |
| | B2 | 1.358 | 1.348 | 1.094 |

| | | | |
|---|---|---|---|
| Length of succeeding pause | A1 | .7 | .5 |
| | A2 | 1.4 | .5 |
| | B1 | 1.9 | 2.05 |
| | B2 | 2.15 | 2. |

TABLE XVII

Passage 8 (In the windless weather . . .)

| Number of syllables in sound units | | 25 | 19 | 11 | 5 | 7 | 11 |
|---|---|---|---|---|---|---|---|
| Length of sound unit | B | 29.96 | 23.1 | 15.7 | 7.4 | 10.82 | 12.62 |
| | C | 29.74 | 22.67 | 14.9 | 8. | 9.95 | 10.15 |
| | D | 23.9 | 17.67 | 11.55 | 5.6 | 7.95 | 8.95 |
| Average syllable rate in sound unit | B | 1.198 | 1.215 | 1.427 | 1.48 | 1.545 | 1.147 |
| | C | 1.189 | 1.1 | 1.354 | 1.6 | 1.42 | .922 |
| | D | .956 | .93 | 1.05 | 1.12 | 1.134 | .813 |
| Length of succeeding pause | B | 3.6 | 3.1 | .2 | 2. | 2.5 | |
| | C | 1.4 | 3.355 | .85 | 2.1 | 3.3 | |
| | D | 1.7 | 3.15 | .3 | 2.5 | 1.2 | |

The average syllable rates given above have been plotted in Graphs D and E, page 59*f*, the better to show the "swing" of the passages. Since length is represented by height, and since increased length corresponds, within a given syllable group, to a decrease in speed, the upward curves denote a slower and the downward a more rapid rate of utterance.

A study of these tables and graphs shows that so far as rate goes Passages 7 and 19 move in general from fast to slow and Passages 6 and 8 from slow to fast; but in 19, for three out of the five readings in which this syllable grouping was found, the movement of the parts goes first from a relatively slower to a relatively more rapid rate and back again to a slower one, then to a very much more rapid rate, and finally to a very much slower one. On the side of absolute length of sound units the figures for 19 read,—longer, shorter, longer, shorter, shortest; while as to syllabic content three of the five units contain the same number of syllables (16), and the final sound unit is less than one-third the syllable length of the recurrent one. Passage 7 is more simple, the gradation being in syllable number and in absolute time as well as in syllable rate.

Passages 6 and 8 represent the opposite type of movement from that of 19. They both go from faster to slower and back

again to faster. The final sound unit in both is longer than the two preceding ones. In both the syllable gradation is from more to fewer to more, and the absolute length from longer to shorter to longer.

The fourth section of the four tables, that devoted to the length of the succeeding pauses, tells us less than the others do. We can say that for Passage 19 the first pause is the longest and the last the shortest in four out of the six readings, and for Passage 8 the second pause is the longest and the third shortest; but the data are too slight and too contradictory for the drawing of any conclusions. As has been seen, pause length is intimately associated with the length of the syllable immediately preceding the pause, and its absolute length is more determined by the logic of the sentence than by the physical character of the sound unit preceding it. See page 32.

## The Principle of Gradation

Another thing to be observed in the tables is the gradation of the changes. Professor Saintsbury probably had only syllables in mind when he wrote the following, but the tables show that the principle holds for the other changes as well. He says that "many of the most attractive rhythm groups in prose appear to be founded on a sort of foot-extension, and then foot-retraction," [37] and again: "This principle of Gradation . . . seems to offer the key to several locks. . . . It appears constantly in respect of sequences of feet in a clause. . . . But something similar is often noticed in larger units. Sentences and clauses follow in succession to each other, drawing themselves out, or shutting themselves up, like slides of a telescope, and presenting a profile like a flight of steps ascending or descending." [38]

A profile like a flight of steps—the figure is a vivid one, and if it is remembered that the steps may be the number of syllables in the sound units, or the successive lengths of sound units, or the successive lengths of the syllables within the sound units, the

[37] Saintsbury, op. cit., p. 450.
[38] Ibid., p. 400.

analogy holds. The preceding tables give the first two. Gradations in the successive lengths of syllables may be studied in the graphs on pages 68 to 73, inclusive.

### Relation of Final Sound Unit to Rate of Utterance

When the progression within the sentence is, like that in Passages 7 and 19, from a more rapid rate of utterance to a slower, the final sound unit is usually a short one. The relatively shorter sound unit that closed both these passages is characteristic of the slow ending. (See Table XVIII.) It is observed in the records that short final sound units give a passage a "dying close," while long final sound units tend to increase the rate of utterance and so to end the sentence briskly. Experiments with mechanical elements show that even when the units are alike, a long series seems faster than a short one.[39] Passages 7 and 8, however, both end with an 11 syllable sound unit; yet 7 has a retarded ending (1.84 is the average of its average rates), while 8 has an accelerated close (.96 is its average rate). Here as elsewhere, long and short, fast and slow, more and fewer, must be regarded as relative terms. In Passage 7 the 11 syllable group is relatively short—it follows 22 and 18 as syllable groups; in Passage 8 it is relatively long,—it follows the syllable groups of 5 and 7. The structural relations of rhythmical forms rather than the absolute length, time, or number is what is important for rhythmical pattern.

### Relation of Syllabic Content to Rate

The following table has been compiled the better to study the relation of syllable content to rate in fluid prose.

The figures in this table are of considerable interest although they are not all of equal importance. Those concerning the longest sound units are probably the least significant because they represent so few occurrences and because, as we have seen on page 48, these longer units tend to break up into shorter ones. Even

[39] Wundt, W., op. cit., p. 49.

TABLE XVIII

Relation of Syllabic Content to Rate

| Number of syllables in sound unit | Number of occurrences | Average rate | Range in rate | Span of range |
|---|---|---|---|---|
| 1 | 5 | 1.37+ | .65–3.06 | 2.41 |
| 2 | 23 | 1.63 | .95–3.28 | 2.33 |
| 3 | 57 | 1.52+ | .65–2.54 | 1.89 |
| 4 | 50 | 1.27— | .8 –1.97 | 1.17 |
| 5 | 78 | 1.62— | .67–2.04 | 1.35 |
| 6 | 62 | 1.34— | .86–2.18 | 1.32 |
| 7 | 64 | 1.14— | .79–1.93 | 1.14 |
| 8 | 37 | 1.14+ | .76–1.38 | .62 |
| 9 | 25 | 1.11+ | .9 –1.9 | 1. |
| 10 | 41 | 1.11+ | .77–1.52 | .75 |
| 11 | 53 | 1.19+ | .81–2.15 | 1.34 |
| 12 | 30 | 1.11 | .91–1.86 | .95 |
| 13 | 43 | 1.17 | .86–1.65 | .79 |
| 14 | 35 | 1.12+ | .92–1.62 | .7 |
| 15 | 18 | 1.16+ | .89–1.37 | .48 |
| 16 | 43 | 1.14 | .74–1.85 | 1.11 |
| 17 | 16 | 1.17— | .94–1.25 | .31 |
| 18 | 26 | 1.09+ | .92–1.62 | .7 |
| 19 | 17 | 1.12— | .93–1.31 | .38 |
| 20 | 9 | 1.14+ | .9 –1.35 | .45 |
| 21 | 3 | 1. + | .89–1.2 | .31 |
| 22 | 7 | 1.07 | .85–1.64 | .79 |
| 25 | 5 | 1.10— | .95–1.19 | .24 |
| 27 | 3 | .96— | .82–1. | .18 |
| 29 | 2 | 1.07+ | .91–1.23 | .32 |
| 34 | 1 | 1.27— | | |

so, there seems to be a general tendency among the long units to the more rapid rates.

Another thing to note in the table is that the next to the most retarded rate is for the group of most frequent occurrence, the 5 syllable group. This slower rate may be interpreted as another evidence of the rhythmic preference given to the 5 syllable group in the fluid prose studied; for the slower rates favor discriminations in all the rhythmic patterns involved in the reading of prose.[40]

But the fact that stands out most sharply from the above table is that there is no regular relation between the number of syllables in a sound unit and the rate at which it is spoken. In a very

[40] MacDougall, *Structure of Simple Rhythm Forms*, p. 331. Also compare with Thomson, *The Rhythm of Speech*, p. 208: "Increased rapidity beyond a certain medium tends, on the principle of economy or ease, to leveling down of quantity and accent; diminished rapidity, on the same principle, to a wider discrimination of those elements."

general way we can say that short sound units are said more slowly than long, and that long sound units tend to spur the reader to more rapid rates. As we have seen in the previous section, this is especially true of final sound units. But beyond this statement we cannot go.

When Bolton says that " The general fact of certain rates being adapted to certain forms of grouping is pretty well established " [41] he is speaking of the results of experiments made with mechanical elements. Words supply so many other aids to grouping that the relation between number and rate is less intimate than he assumes.

This conclusion is borne out by the figures in the column giving the range in syllable rate. They show the great variation in time taken to speak any given number of syllables. Rate would seem to be determined, then, not by the number of syllables in the sound unit, but by the relation of the sound unit to the sentence as a whole, by its part, that is, in the sentence movement.

An illustration of what is meant can be seen in Passage 19 (page 58, Table XIV), a passage in which for most readers the 16 syllable group makes up three of the five sound units. There is for all readers a comparatively slow reading for the initial group and a much more rapid reading for the third group. For most readers the second group falls between the two extremes, making the total effect one of steadily increasing momentum through the third 16 syllable group up to the last 5 syllables for which the whole sentence has been preparing, and on which the voice as well as the mind lingers.

In conclusion, then, we can say that while the number of syllables in a sound unit naturally affects the absolute time, the changes in *tempo,* the accelerations and retardations, the tensions and relaxations of speech are relatively not dependent on it.

## Changes in Rate

And it is to these changes in *tempo* or rate, these accelerations and retardations, that we look for an understanding of what gives

[41] Bolton, op. cit., p. 220.

us, so far as time goes, our special pleasure in the rhythm of prose. Wundt [42] has pointed out that pleasantness of rhythm depends on the repetition of feelings of tension and on the contrast between them and feelings of relaxation. Bolton[43] concluded from his experiments that sudden changes in rate give dissatisfaction and that gradual ones give pleasure.

In this connection it is well to remember the psychological point of view that we get our sense of time from rhythm rather than rhythm from time.[44] In his work on time in English verse Mr. Warner Brown says, "Grouping in rhythm is an affective experience and if we place it simply in the dimension of strain and relaxation it at once becomes clear why no regular time relations are necessary. The regularity becomes a matter of recurrence of strain at the end of a definite cycle. The muscles may take a longer or a shorter time to accomplish their cycle and the strain may not come at equal intervals of time, but the swing is there and from one place to the next like place is a definite mental state held together by the continuous circular process." [45]

## Syllable Movement

The changes in rate discussed up to this point have been changes from sound unit to sound unit and Graphs D and E attempt to show the general onward movement of the sentence, the changes in large from faster to slower and from slower to faster. They are based, however, on the average syllable rate in the successive sound units and so represent the general effect only; they give no idea of the movement within the sound unit. For no sound unit is spoken at even an approximately regular rate. Against the larger movement of the sound units and affected by it is the smaller movement of the individual syllables, their retardations and accelerations. In terms of time this appears as a progression of long and short syllables. Of course such a progression is intimately associated with changes in stress and

[42] Wundt, W., op. cit., III: 144.
[43] Bolton, op. cit., p. 236.
[44] MacDougall, *Rhythm, Time, and Number,* p. 93.
[45] Brown, *Time in English Verse Rhythm,* Archives of Psychol., No. 10, 1908.

pitch, but for the present all we are concerned with is trying to measure and represent the time movement of the syllables.

Even this is not easy to do. For since syllables differ phonetically in the time necessary to say them, their measured lengths need to be corrected in some way before we can be sure which syllables were lengthened because the reader felt their importance, logical and rhythmical, and which are long simply because of their phonetic weight. For instance, the syllable *drawn* will always occupy more time than the syllable *it;* how are we to know when *it* is regarded by the reader as more important than *drawn?* The correction factor used was that of nonsense syllables.

## Nonsense Syllables

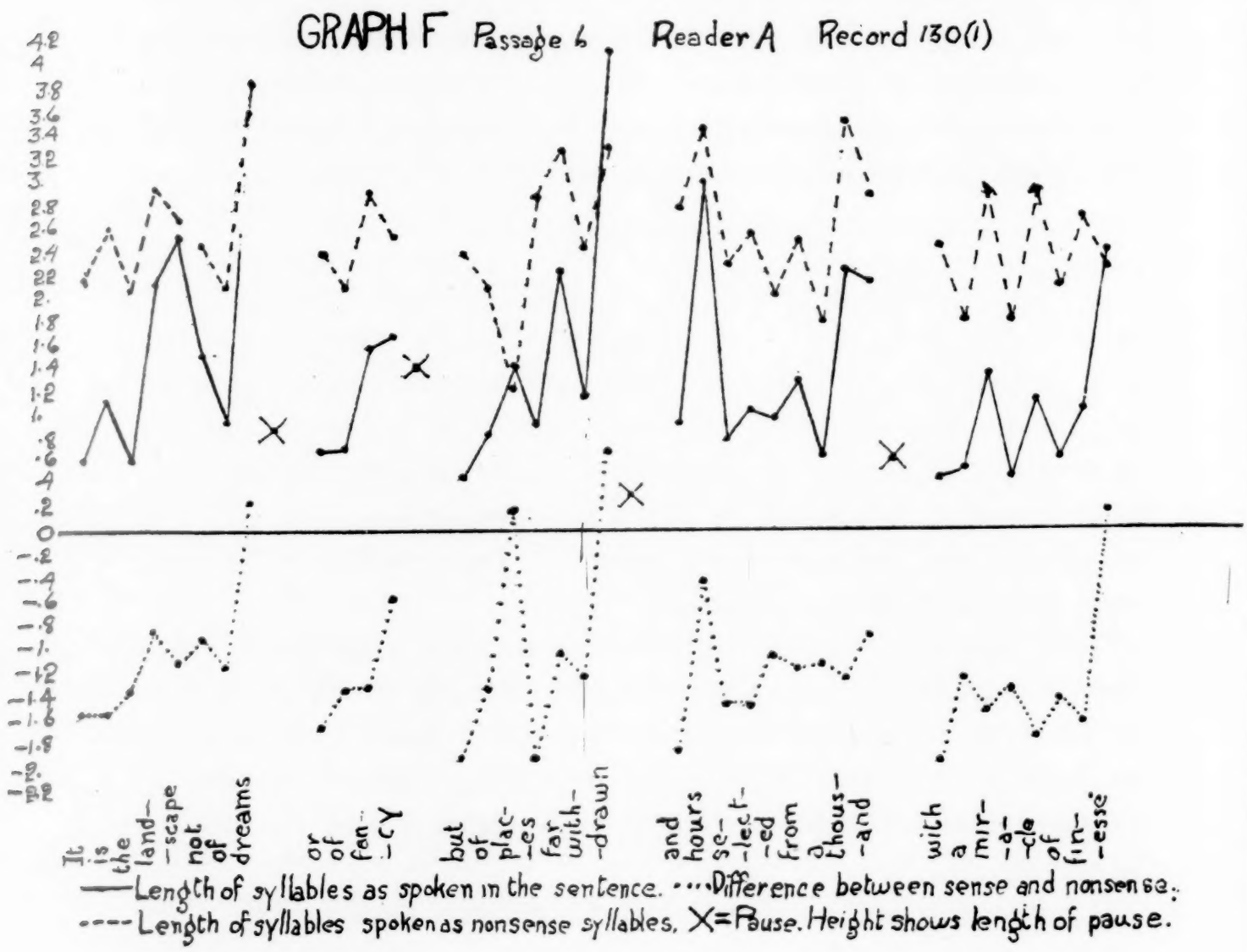
All the syllables appearing in the material used were arranged in nonsense order and read in sections by the various readers. But before the reading took place the readers were asked to practice the lists until they could say them with as little stress and as nearly in monotone as possible. To help keep the reader from establishing a rhythm of his own a metronome was used. It was set at 69, and the reader was asked to begin a new syllable at each oscillation of the pendulum.

The hope was that we might in this way get a standard length for each syllable for the given reader, a length which could then be subtracted from the length of the same syllable as it occurred in the flow of speech and so arrive at a better idea of the stretchings-out and telescopings that syllables undergo in the spoken sentence.

Unfortunately the method was not entirely satisfactory. The regular beats of the metronome tended to standardize the syllable lengths and the setting off by pause drew the syllables out way beyond their phonetic lengths. The special emphasis each syllable so set off and timed inevitably received was another disturbing factor. If a reader had such perfect control of his vocal organs that he could read the syllables in rapid succession without intervention of pause, we might more nearly approach the natural syllable length and so secure a better standard of comparison.[46]

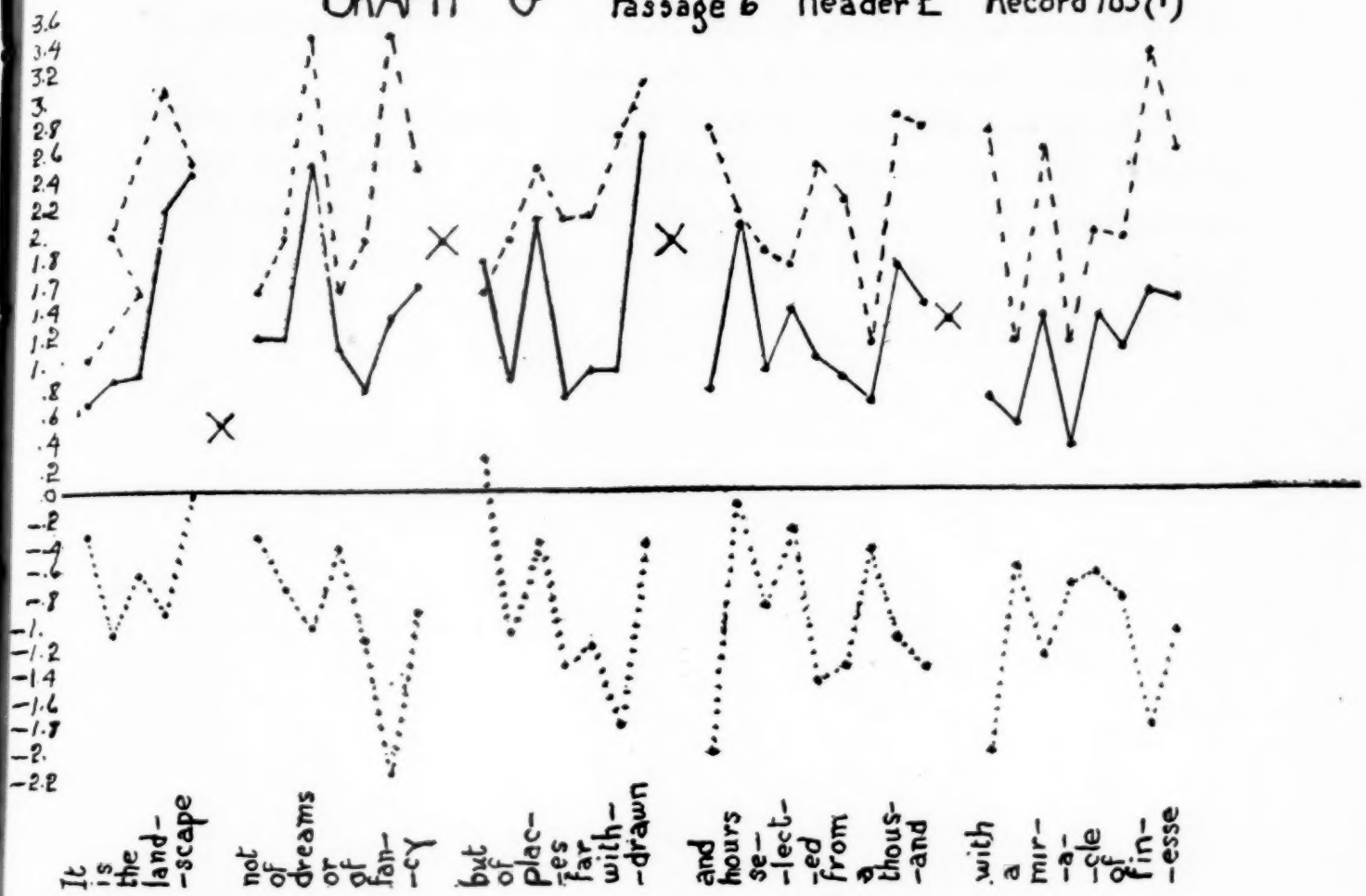
[46] The writer is experimenting with this method in another study on which she hopes to report later.

But faulty as it is, the present method gives us an approximate constant, and a plotting of the nonsense syllable lengths over the speech lengths of the syllables will at least show at a glance what syllables are phonetically strong and what use the writer has made of the fact.


GRAPH F Passage 6 Reader A Record 130(1)
It is the land- -scape not of dreams
or of fan- -cy
but of plac- -es far with- -drawn
and hours se- -lect- -ed from a thous- -and
with a mir- -a- -cle of fin- -esse
——Length of syllables as spoken in the sentence. ···Difference between sense and nonsense.
----Length of syllables spoken as nonsense syllables. X=Pause. Height shows length of pause.

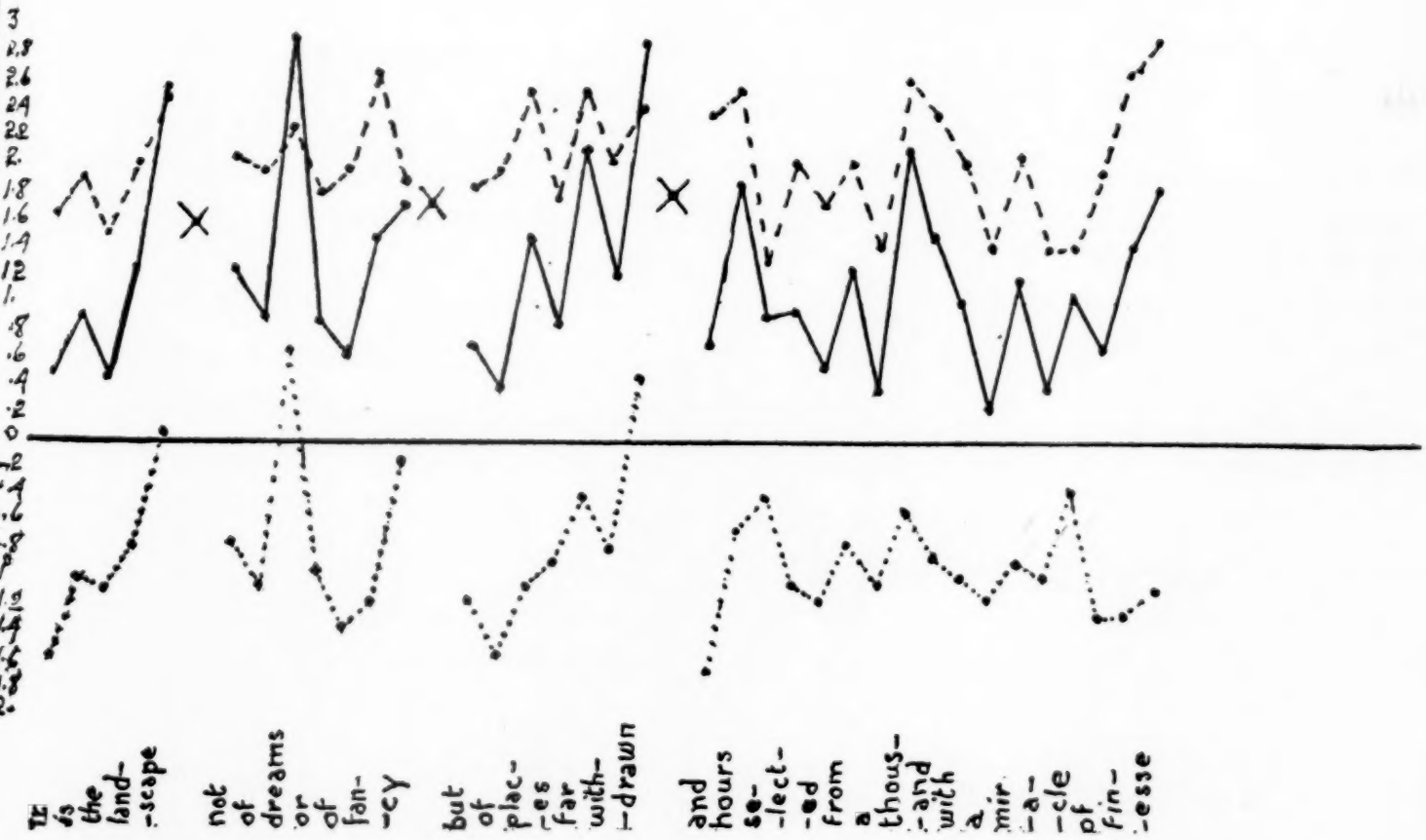
Some passages are plotted in three ways,—for syllable length, for nonsense syllable length, and for the difference between the two lengths. See Graphs F, G, and H, page 69. More are plotted in two ways only, syllable and nonsense syllable length. See Graphs I, J, K, and L. For purposes of comparison one passage of spaced prose is given as it was read by three different readers. See Graph M. In these graphs the sound units are set

GRAPH G Passage 6 Reader E Record 105(1)




—Length of syllables as spoken in the sentence ···Difference between sense and nonsense
----Length of syllables spoken as nonsense syllables X=Pause. Height shows length of pause

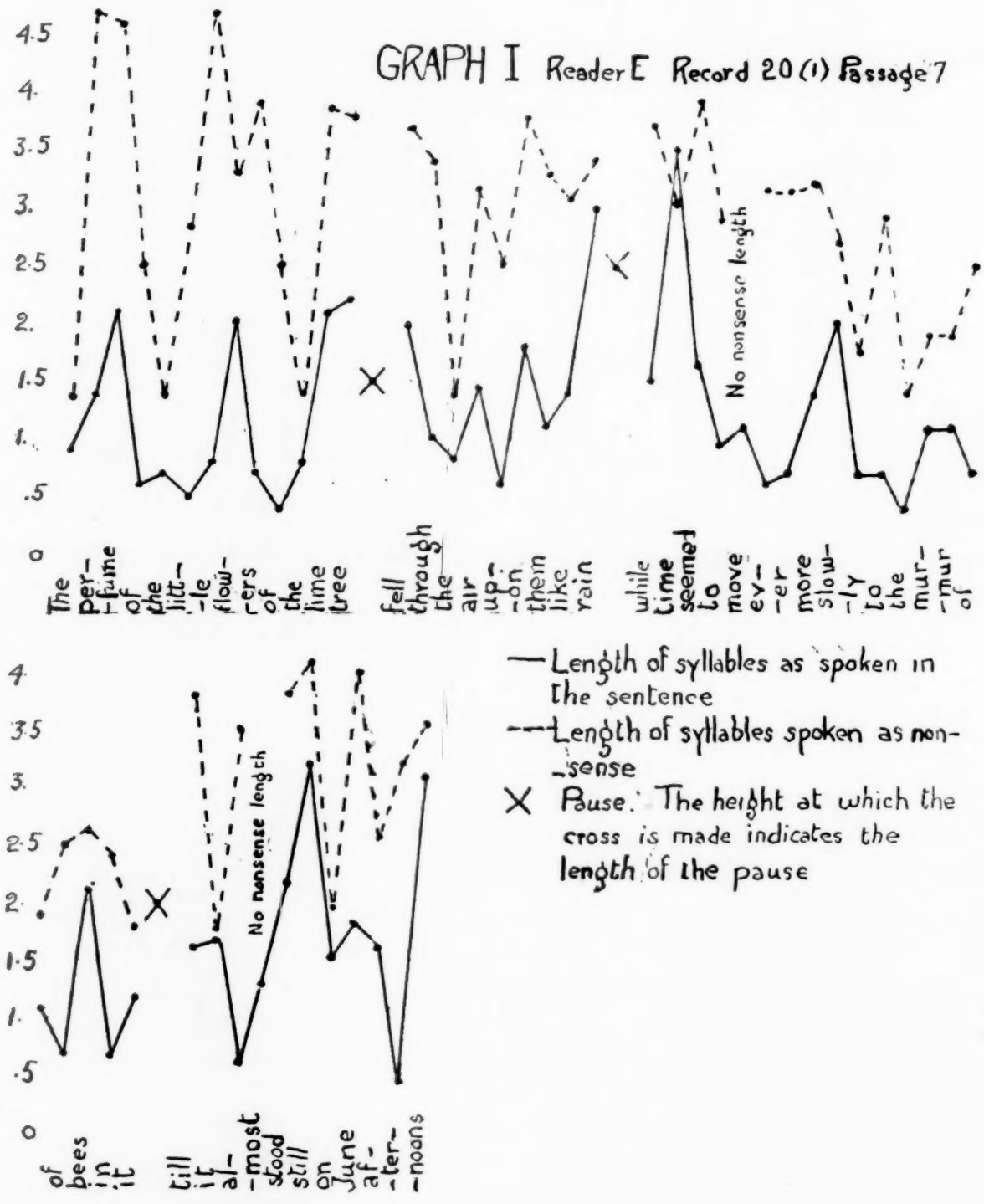
GRAPH H Passage 6 Reader F Record 96

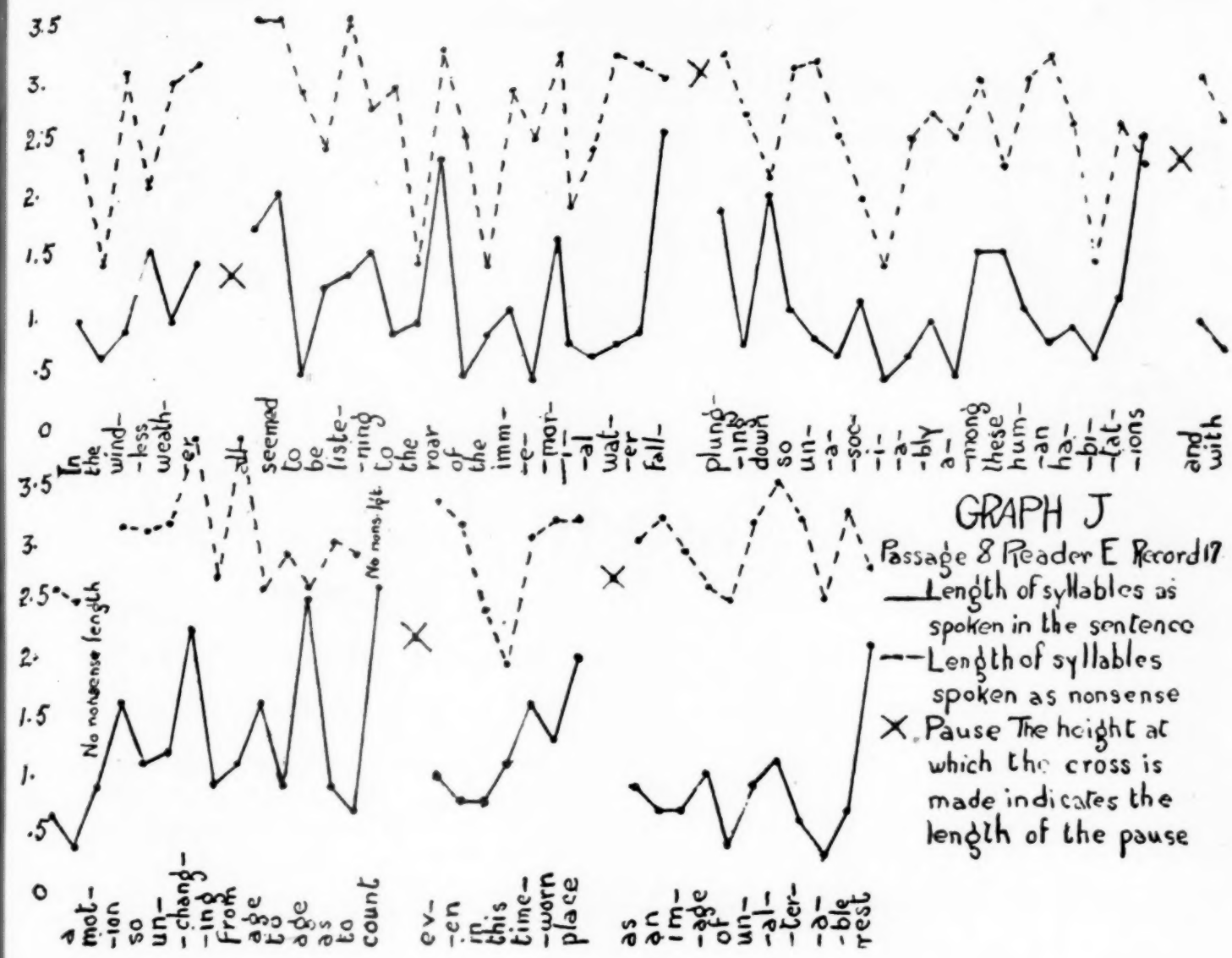



—Length of syllables as spoken in the sentence ··· Difference between sense and nonsense
---Length of syllables spoken as nonsense syllables X=Pause. Height shows length of pause

off from one another by space, and the length of the pause is indicated by the position of a cross in that space.

These graphs present to the eye various things previously mentioned. The frequently symmetrical placing of pause is more clearly seen, and the relation of the sound units to one another. But the relation of the syllables to one another is what is of especial interest.


GRAPH I Reader E Record 20 (1) Passage 7
4.5
4.
3.5
3.
2.5
2.
1.5
1.
.5
0
No nonsense length
The per- -fume of the litt- -le flow- -ers of the lime tree fell through the air up- -on them like rain while time seemed to move ev- -er more slow- -ly to the mur- -mur of
of bees in it till it al- -most stood still on June af- -ter- -noons
— Length of syllables as spoken in the sentence
--- Length of syllables spoken as non- -sense
X Pause. The height at which the cross is made indicates the length of the pause


3.5
3.
2.5
2.
1.5
1.
.5
0
In the wind- -less weath- -er
seemed to be liste- -ning to the roar of the imm- -e- -mor- -i- -al wat- -er fall-
plung- -ing down so un- -a- -soc- -i- -a- -bly a- -mong these hum- -an ha- -bi- -tat- -ions
and with
No nonsense length
No nons. lgt.
mot- -ion so un- -chang- -ing from age to age as to count
ev- -en in this time- -worn place
as an im- -age of un- -al- -ter- -a- -ble rest

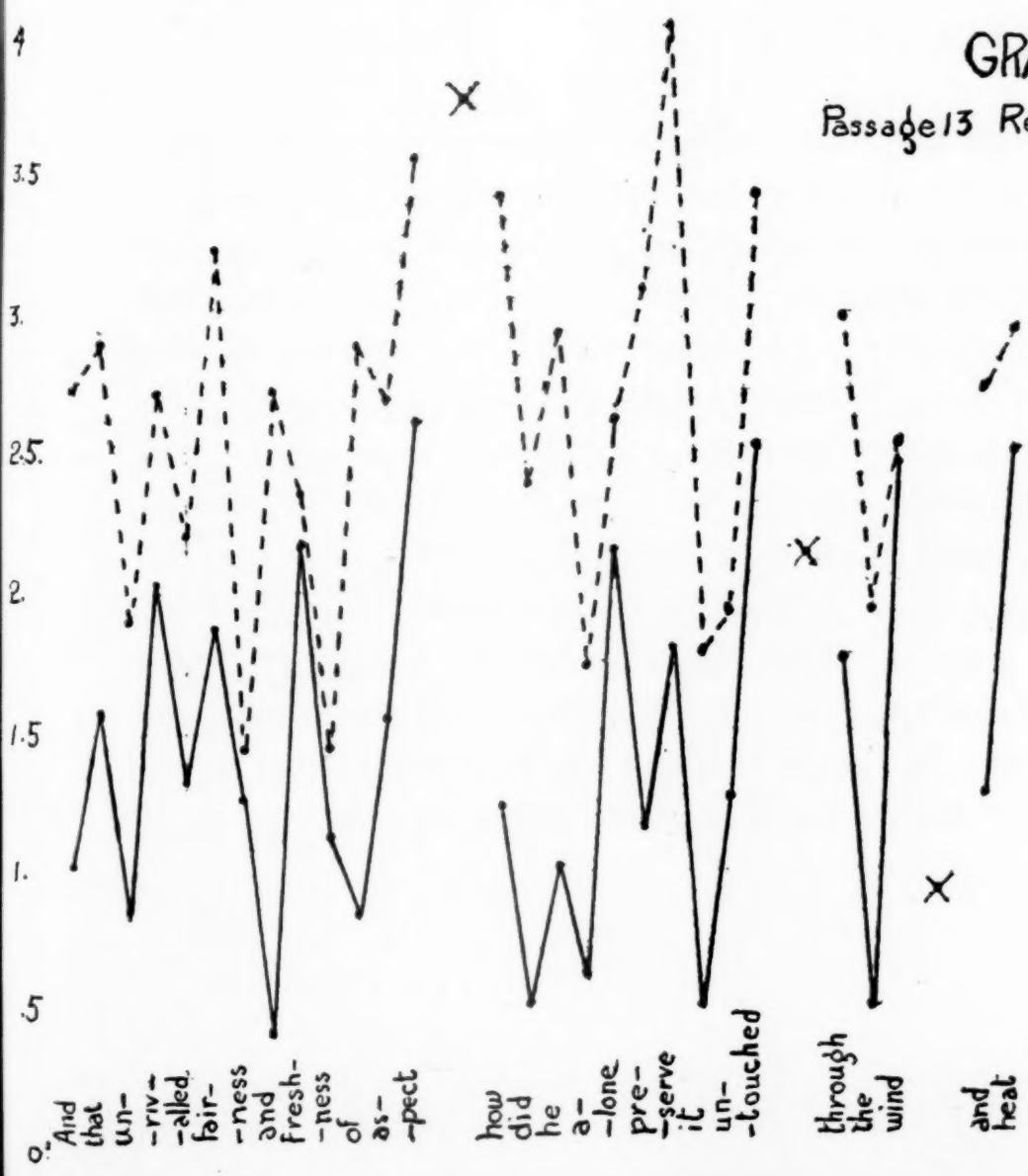
GRAPH J

Passage 8 Reader E Record 17

—— Length of syllables as spoken in the sentence

– – – Length of syllables spoken as nonsense

× Pause The height at which the cross is made indicates the length of the pause



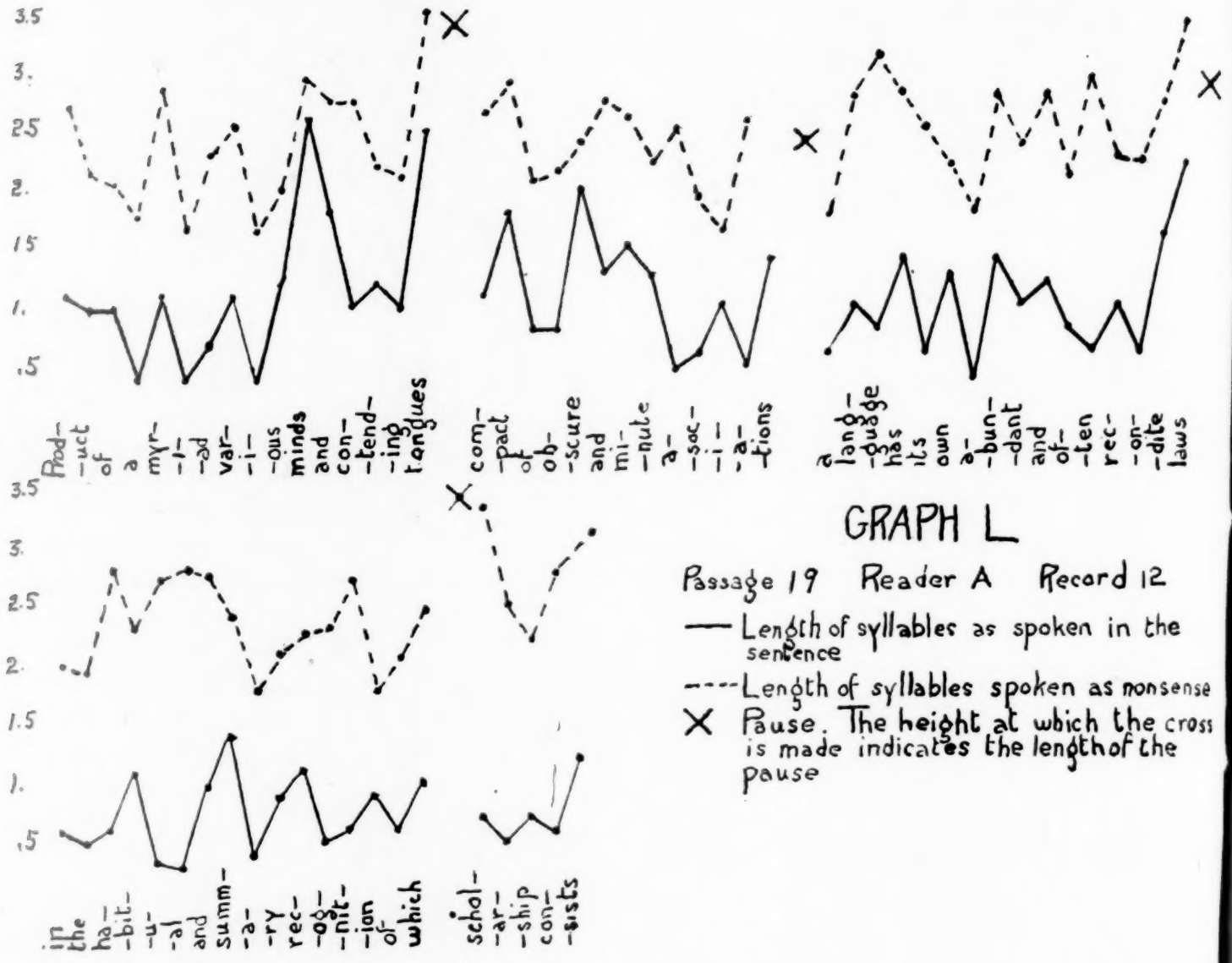

GRAPH K

Passage 13 Reader G Record 119

—— Length of syllables as spoken in the sentence

– – – Length of syllables spoken as nonsense

× Pause The height at which the cross is made indicates the length of the pause


3.5
3.
2.5
2.
1.5
1.
.5
Prod- -uct of a myr- -i- -ad var- -i- -ous minds and con- -tend- -ing tongues
com- -pact of ob- -scure and mi- -nute a- -soc- -i- -a- -tions
a lang- -uage has its own a- -bun- -dant and of- -ten rec- -on- -dite laws
in the hab- -it- -u- -al and summ- -a- -ry rec- -ogn- -it- -ion of which
schol- -ar- -ship con- -sists

## GRAPH L

Passage 19 Reader A Record 12

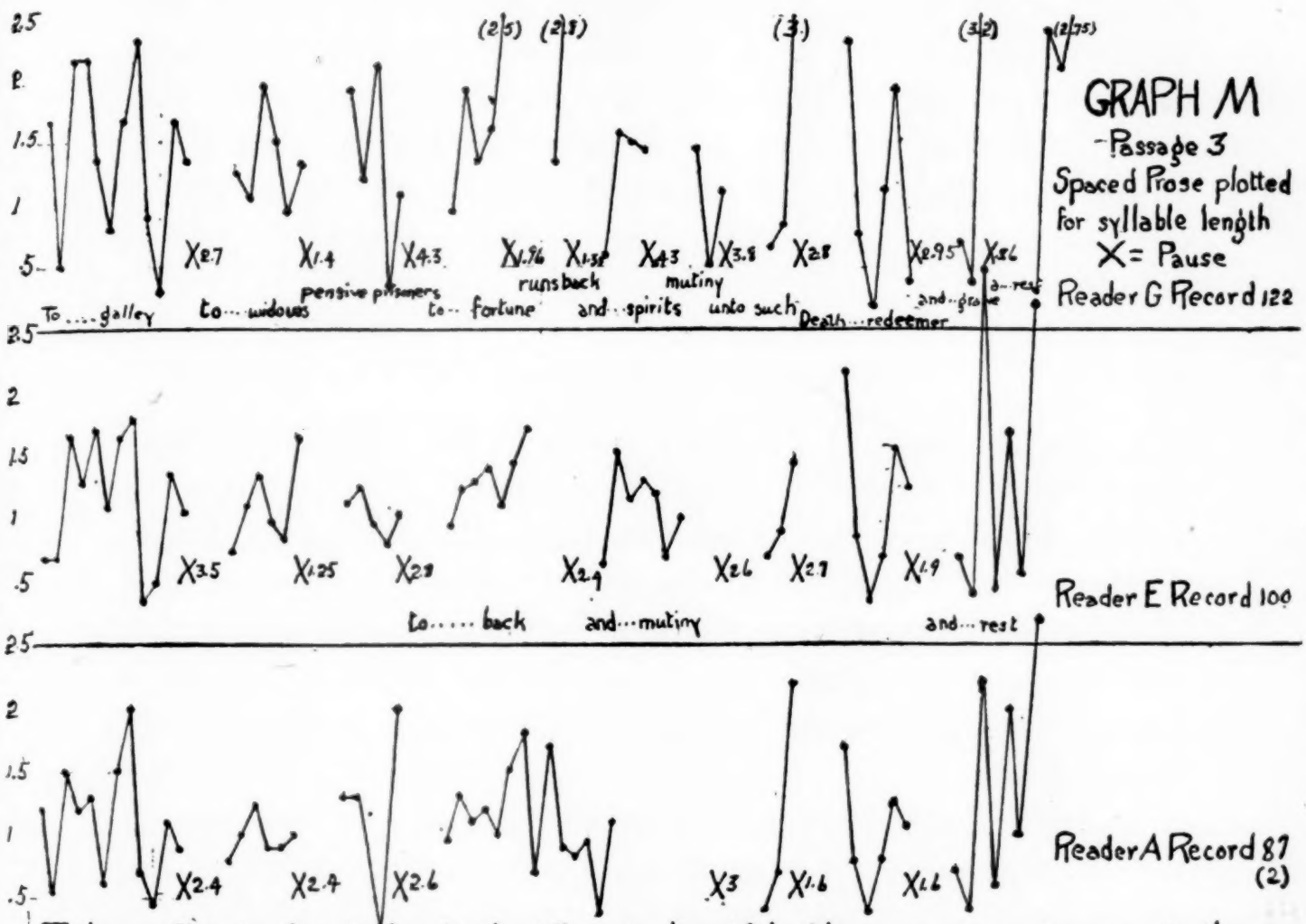
—— Length of syllables as spoken in the sentence

---- Length of syllables spoken as nonsense

× Pause. The height at which the cross is made indicates the length of the pause

It is clear from the many different quantitative relationships of syllables why the marking of prose into feet results in confusion rather than in simplification, and it will be noticed that in the spaced prose passage (Graph M) these relationships are both fewer and simpler. On page 40-A of Professor Snell's study is a graph of the syllable lengths for some lines of Milton's blank verse which furnishes further comparative material. The interest here lies rather in the likenesses than in the differences, for they suggest that the mere fact of alternations of longs and shorts is not what gives a passage its characteristic movement, but rather the way in which the alternations form the larger structure of the phrase, line, or sound unit and the consequent changes of *tempo*. In Graph H, page 69, the organization of the sound unit *but of places* is a good illustration of what is meant.

Less marked it appears in all the graphs. In a more simple form of this same type of larger movement the alternations are omitted and the syllables build up to length in a straight line and sometimes down again. See, for instance, the sound unit *or of fancy* in Graph F, page 68.




Another thing that meets the eye in these graphs is that in most cases the syllables that have the greatest nonsense length are the syllables that occupy positions of logical and rhythmical importance in the sentences in which they appear. In other words the author has expressed his thoughts and feelings in words whose stressed syllables are phonetically weighty or long. Read through the longest nonsense syllables and you come upon *land, scape, dreams, fan, far, drawn, hours, thous(thousand), per, fume, lit, flow(flowers), lime, fell, rain, time, seemed, till, still,*

*June, noons, wind, weath(weather), roar, fall, plunge, these, change, place, all, found, him, home, sprung, how, he, serve(preserve), touched, fair, pect, minds, tongues, pact, guage(language), laws,* and *schol(scholarship).* The list is conspicuous for the number of monosyllabic words in it. The syllables fall into two classes,—those that are weighty because of the complexity of their content—syllables like *scape* in *landscape,* for instance, or *guage* in *language*—and syllables that contain elastic vowels or consonants—*seemed* and *rain,* for example—syllables in which the vowels and liquids can be indefinitely prolonged. Many of the time effects in these passages can be traced to Pater's use of liquids.

## Summary of Chapter IV

1. The elements of flexibility noted in the behavior of fluid prose,—the variations in sound unit length, in the number of syllables making up the sound unit, and in the placing and length of pause—are all factors in creating the rhythmic movement of fluid prose. Progressive changes in these elements, together with changes of syllable length within the sound unit, give a passage its characteristic swing by introducing changes in the speaking rate.

2. These changes are not regularly alternative in their character but progressive. The resulting rhythm is that of flowing line rather than of recurrent pattern.

3. While the number of syllables in a sound unit naturally affects the absolute time and so makes a pattern of its own, changes in *tempo,* the accelerations and retardations, are relatively independent of it. That is, a sound unit made up of a given number of syllables may in itself vary widely in the rate at which it is said. Its rate is determined by its relation to its surroundings, the movement of the sentence as a whole.

4. However, short final sound units tend to retard the time and make for a "dying close"; long ones tend to accelerate it.

5. Syllable groups that are rhythmically favored tend to be said more slowly than other groups. It is suggested that this

may be the better to bring out the other rhythmic patterns involved, such as those of pitch and stress.

6. Over against the larger movement from sound unit to sound unit and part of it, is the smaller movement of the individual syllables within the unit, the longs and shorts. The way in which these are organized is further illustration of the principle of progressive gradation. See 2 above.

7. It is suggested that so far as time relations go, the distinctive rhythm of fluid prose may be interpreted in terms of the changes in tension, strains and relaxations that accompany the progressive changes in *tempo*.

8. A comparison of nonsense lengths with the lengths of the same syllables as they occur in speech shows that one element in effective writing is the choosing for positions of logical and rhythmical importance syllables that are phonetically strong.

9. Syllables that contain liquids are important in forming time patterns because they can be stretched out to almost any length.

# CHAPTER V—CONCLUSION

## General Discussion

In conclusion we return to our original question and ask what then do voice records show as to the rôle that time plays in the rhythm of prose?

For answer we can say that time enters into the reading of prose in three ways,—in the duration of the silences that set off sound, in the duration of the sounds thus set off, and in the changing *tempo* at which the sounds are spoken. These three factors determine what we call the time pattern of prose.

In prose that is, relatively speaking, less rhythmic, pauses tend to be shorter, sound units longer, and the speaking rate more rapid than in more rhythmic prose. This, together with the fact that in both verse and rhythmic prose the sound units of most frequent occurrence, the apparently rhythmically favored sound units, are set off by longer pauses and are spoken at slower rates than other sound units, seems to suggest that time however fundamental to rhythm acts also as a handmaiden to it. For the slower rates and the longer pauses allow of finer discriminations in pitch, intensity, and tone color, and so by bringing out these other patterns add to the richness of the fabric.

The time pattern itself differs somewhat for different types of prose. That of spaced prose is very similar to that of blank verse. Indeed we find here prose but recently emerged from verse and still under its influence achieving many of its effects in the way of verse. It preserves its integrity as prose by never lapsing into meter, but behaves in other ways like blank verse. Modern prose has developed away from this earlier type and is distinguished by greater variety and flexibility in length and content of sound unit and in pause length, and so to greater flexibility in sentence movement. The effect of this greater flexibility is to initiate successive changes of *tempo,* and the resulting pattern is that of flowing line rather than of recurrent design.

Two things must be remembered, however, first that all language is potentially rhythmic, and so there are no hard and fast divisions between the different kinds of prose here studied, and between spaced prose and blank verse. Like colors in a spectrum they are distinct from one another at their centers, but each merges by degrees into the next—blank verse into spaced prose, spaced prose into fluid prose, fluid prose into so-called non-rhythmic prose.

The second thing to be held in mind is that the rhythmic pattern of prose is a composite of the different rhythms involved,—time, stress, pitch, tone-color; and that a study like the present which deals with only one of these cannot and does not attempt to tell the whole story. Indeed the evidence here given seems rather to point to the importance of the other rhythms for a full understanding of the problem.

The specific points made in the present study are listed below.

## Summary of Results

I. The placing of pause is not determined by the necessity for taking breath; for breathing is freely adapted to the logical, rhetorical, and rhythmic demands of the passage read. Trained readers make greater use of pause than do untrained readers.

II. So far as the relation of punctuation to pause goes, 89.4 per cent of all marks of punctuation in the prose read were paused. In prose, periods and semicolons command longer pauses, and commas shorter ones than in blank verse. Of the pauses made 22.93 per cent are made at points where there is no punctuation. These pauses are shorter than pauses made at punctuation marks, and also shorter than unpunctuated pauses in verse.

III. Strictly speaking, there is no such thing as good prose that is non-rhythmic. Material that is matter-of-fact in content is read more rapidly than that which is imaginative. And sentences built up out of restrictive phrases and clauses, and so admitting of little pause, are usually less rhythmic in effect than sentences so built as to admit of much pause. Thus the use made

of pause and reading rate are important factors in our judgment of the rhythm of a passage as it is read.

IV. Voice records show that when it is read, prose judged to be non-rhythmic is distinguished from other prose by fewer and shorter pauses; by the fact that the length of the pauses bears no special relation to the length or character of the sound unit; that the sound units themselves are of all lengths; that the speaking rate is more rapid and less varied than for other forms; and that no one syllable group occurs more frequently than any other.

V. Prose judged to be rhythmic is of two kinds: the older prose which depends for its effect on a balancing of phrases and clauses, here called spaced prose; and the more modern prose in which the effect is one of movement rather than of balance, here called fluid prose.

Voice records show spaced prose to be very closely allied with blank verse. It contains approximately the same amount of pause, 19 per cent of the whole speaking time. In the agreement in the placing of pauses there is even greater uniformity than was found for blank verse. Like blank verse there is less difference between the pauses within the sentence and those at the end of the sentence than there is for fluid prose. The average length of pause is even longer than that for blank verse, though the pause of most frequent occurrence is a tenth of a second shorter. The average sound unit is only 1.12 syllables longer than that of blank verse (2.26 syllables shorter than fluid prose); the range in the number of syllables is only 2 more than that of blank verse (11 syllables less than that for fluid prose); the span of the range in the speaking time for spaced prose sound units is within .38 (.076 second) of that for blank verse. So far as the average time of the sound unit goes, spaced prose is again closer to blank verse than to fluid prose. It resembles blank verse also in the fact that the temporal stability of its sound units does not extend to the longer sound units. For blank verse it extends only through the 10-syllable group; for spaced prose through the 13-syllable group.

VI. Fluid prose differs from spaced prose and blank verse in

the smaller sum-total of pause used and in the greater variety and flexibility in the length of the sound units, and in the placing and length of the pauses. In placing of pause, however, readers show as great agreement for fluid prose as for blank verse; that is, as many readers recognize the prose pattern by pause as recognize the more regular pattern of blank verse. Pauses made by all readers are longer than those not made by all. The length of the pause shows the relative importance, logical and rhythmical, of the phrase set off. The more frequently recurring sound units are set off by the relatively longer pauses.

Fluid prose also shows a greater range in the number of syllables making up the sound units, and a consequent greater range in the speaking time. The extent of the flexibility of fluid prose, as well as its other characteristics, is shown by the following figures.

The average number of syllables which constitute a fluid prose sound unit is 9.68—, with a range from 1 to 34 syllables. The average time of the sound unit is 11.37— (2.27 seconds), with a range from .65 (.13 second) to 43.3 (8.66 seconds). The 5 and 7 syllable groups occur most frequently in the fluid prose studied. The length of the median sound unit is 9.62 (1.92 seconds), and that of the mode is 9.4 (1.88 seconds). The most frequent lengths are from 6 to 7 (1.2 to 1.4 seconds), and from 9 to 10 (1.8 to 2 seconds).

The average length of a pause for fluid prose is 2.12+ (.425 second), with a range in length the span of which is 9.75 (1.95 seconds). The median is 1.8 (.36 second), and the pause of most frequent occurrence is 2 (.4 second). For pauses within the sentence the average number is 5.43—, and the average length 1.99 (.398 second). The average length of pauses between sentences is 4.57—(.015 second).

VII. The likeness of fluid prose to spaced prose and blank verse is evidenced by the fact that the median sound unit is only .67 (.134 second) longer than the blank verse median, and 1.22 (.244 second) longer than that of spaced prose. The sound unit of most frequent occurrence is somewhat nearer in length

to that of blank verse—it is 1.45 (.29 second) longer—than it is to that of spaced prose. It is 2.8 (.56 second) longer than the spaced prose unit of most frequent occurrence. The average sound unit of fluid prose has 2.26 more syllables than that of spaced prose, the average speaking time of the sound unit being 2.27 (.45 second) longer. From these figures it appears that while fluid prose sound units have greater variety and flexibility than those of spaced prose and blank verse, they differ from them more in degree than in kind.

VIII. Further ways in which fluid prose behaves rhythmically are that up through the 20 syllable group the length of the sound unit and the succeeding pause bear a regular relation to the number of syllables in it.

IX. Another factor that establishes the phrase rhythm of fluid prose is the relation which the successive sound units bear to one another as regards the number of syllables in the units, the length of the units, and the rates at which they are spoken. Progressive changes in these elements give a passage its characteristic swing. These changes correspond to changes in tension, a tightening and a relaxing that make for the individual a rhythmic experience.

X. While short final sound units are retarding in their effect and long ones accelerating, a sound unit made up of a given number of syllables may vary widely in the rate at which it is said, according to its relation to the adjacent sound units.

XI. In rhythmic prose and in good writing generally, syllables phonetically strong hold positions of logical and rhythmical importance.

## LIST OF BOOKS AND ARTICLES REFERRED TO IN THE TEXT

No attempt has been made to include a bibliography as the field is already well covered. C. A. Ruchmich's *A Bibliography of Rhythm,* Am. Jour. Psychol., XXIV: 508–519, 1913, is a most thorough compilation up to the time of its publication, and the writer understands that Mr. Ruchmich is at work on an edition that will bring it up to date. An excellent bibliography is also to be found in W. M. Patterson's *The Rhythm of Prose.*

1. On Prose and Verse Rhythm:

Andrews, C. E. The Rhythm of Prose and Free Verse. *Sewanee Rev.,* April–June, 1918.

Clark, Albert. Prose Rhythm in English. Oxford, 1913.

Croll, Morris W. The Cadence of English Oratorical Prose. *Studies in Philology,* Jan., 1919.

Draat, van, Fijn P. Rhythm in English Prose. Heidelberg, 1910.

Goodell, Thomas Dwight. Chapters on Greek Metric. New York, 1901.

Jacob, Cary F. The Foundations and Nature of Verse. New York, 1918.

Marbe, Karl. Über den Rhythmus der Prosa. Giessen, 1904.

Morris, A. R. The Orchestration of the Metrical Line. Boston, 1924.

Murry, Middleton. The Problem of Style. Oxford, 1922.

Patterson, William Morrison. The Rhythm of Prose. New York, 1916.

Saintsbury, George. A History of English Prose Rhythm. London, 1912.

Scott, Fred Newton. The Most Fundamental Differentia of Poetry and Prose. Mod. Lang. Assoc. Pub., 19: 258, 1904.

Shelly, John. Rhythmical Prose in Latin and English. *Church Quart. Rev.,* April, 1912.

Snell, Ada L. F. Pause: A Study of its Nature and Rhythmical Function in Verse, Especially Blank Verse. No. VIII, Contributions to Rhetorical Theory edited by Fred Newton Scott, Ann Arbor, 1918.

Thomson, William. The Rhythm of Speech. Glasgow, 1923.

Wallin, J. E. Wallace. Researches on the Rhythm of Speech. Studies from the Yale Psychol. Lab., IX: 1–143, 1901.

2. On the Psychology of Rhythm:

Bolton, T. L. Rhythm. *Am. Jour. Psychol.,* VI: 145–238, 1894.

Brown, Warner. Time in English Verse Rhythm; an Empirical Study of Typical Verses by the Graphic Method, New York, 1908.

Dietze, Georg. Untersuchungen über den Umfang des Bewusstseins bei regelmässig aufeinanderfolgenden Schalleindrücken. Wundt's Philos. Stud., II: 383, 1885.

Hurst, A. S. and McKay, J. Experiments on the Time Relations of Poetic Meters. University of Toronto Studies, Psychol. Series, No. 3, 157–175, 1899.

James, William. The Principles of Psychology. Vol. I, New York, 1890.

MacDougall, Robert. The Structure of Simple Rhythm Forms. Harvard Psychol. Stud., I: 309, 1903.

MacDougall, Robert. Rhythm, Time and Number. *Am. Jour. Psychol.,* XIII: 88, 1902.

Meumann, Ernst. Untersuchungen zur Psychologie und Aesthetik der Rhythmus. Wundt's Philos. Stud., X: 249–328 and 393–430, 1894.

Ruchmich, Christian A. The Rôle of Kinaesthesis in the Perception of Rhythm. *Am. Jour. Psychol.,* XXIV: 305, 1913.

SHEPARD, JOHN F. Apparatus for Experimental Phonetics. *Psychol. Bul.*, Feb. 15, 1913, pp. 66–67.

SMITH, MARGARET E. Rhythmus und Arbeit. Wundt's Philos. Stud., XVI: 197, 1900.

STETSON, R. H. Rhythm and Rhyme. Harvard Psychol. Stud., I:413–466, 1903.

STETSON, R. H. Motor Theory of Rhythm and Discrete Succession. *Psychol. Rev.*, XII: 250–270 and 293–350, 1905.

SWINDLE, P. F. On the Inheritance of Rhythm. *Am. Jour. Psychol.*, XXIV: 180–203, 1913.

WOODROW, HERBERT. A Quantitative Study of Rhythm: the Effect of Variations in Intensity, Rate, and Duration. New York, 1909.

WOODROW, HERBERT. The Rôle of Pitch in Rhythm. *Psychol. Rev.*, XVIII: 54, 1911.

WUNDT, WILHELM. Grundzüge der physiologischen Psychologie. Vol. III, Leipzig, 1903.

3. UNCLASSIFIED:

American Text Book of Physiology, edited by W. H. Howell, Philadelphia, 1901.

MILLER, D. C. The Science of Musical Sounds. New York, 1916.

SCRIPTURE, E. W. Elements of Experimental Phonetics. New York, 1902.